

COBRE Directory of Active Awards by State *As of January 2018*



Center for Research Capacity Building
National Institute of General Medical Sciences
National Institutes of Health

Table of Contents

<u>State/Principal Investigator</u>	<u>Page</u>
Alaska	3
Arkansas	4-8
<u>Garcia-Rill, Edgar E.</u>	4
<u>Hauer-Jensen, Martin</u>	5
<u>Smeltzer, Mark S.</u>	6
<u>Tackett, Alan Johnson</u>	7
<u>Weber, Judith Lynne</u>	8
Delaware	9-15
<u>Buchanan, Thomas S.</u>	9
<u>Edwards, David G.</u>	10
<u>Fox, Joseph M.</u>	11
<u>Harrington, Melissa A.</u>	12
<u>Polenova, Tatyana</u>	13
<u>Shaffer, Thomas H.</u>	14
<u>Stuart, Marie J.</u>	15
Hawaii	16-19
<u>Gerschenson, Mariana</u>	16
<u>Shohet, Ralph V.</u>	17
<u>Ward, William Steven</u>	18
<u>Yanagihara, Richard</u>	19
Idaho	20-23
<u>Forney, Larry J.</u>	20
<u>Oxford, Julia T.</u>	21
<u>Stevens, Dennis L.</u>	22
<u>Wichman, Holly A.</u>	23
Kansas	24-30
<u>Abrahamson, Dale R.</u>	24
<u>Hanzlik, Robert P.</u>	25
<u>Jaeschke, Hartmut</u>	26
<u>Kirkpatrick, Kimberly</u>	27
<u>Lunte, Susan</u>	28
<u>Lutkenhaus, Joe</u>	29
<u>Prisinzano, Thomas Edward</u>	30
Kentucky	31-37
<u>Bhatnagar, Aruni</u>	31
<u>Cassis, Lisa</u>	32
<u>Hersh, Louis B.</u>	33
<u>Kyrkanides, Stephanos</u>	34
<u>McClain, Craig J.</u>	35
<u>Miller, Donald M.</u>	36
<u>St Clair, Daret K. (Contact);</u>	37
<u>Zhou, Binhua P.</u>	

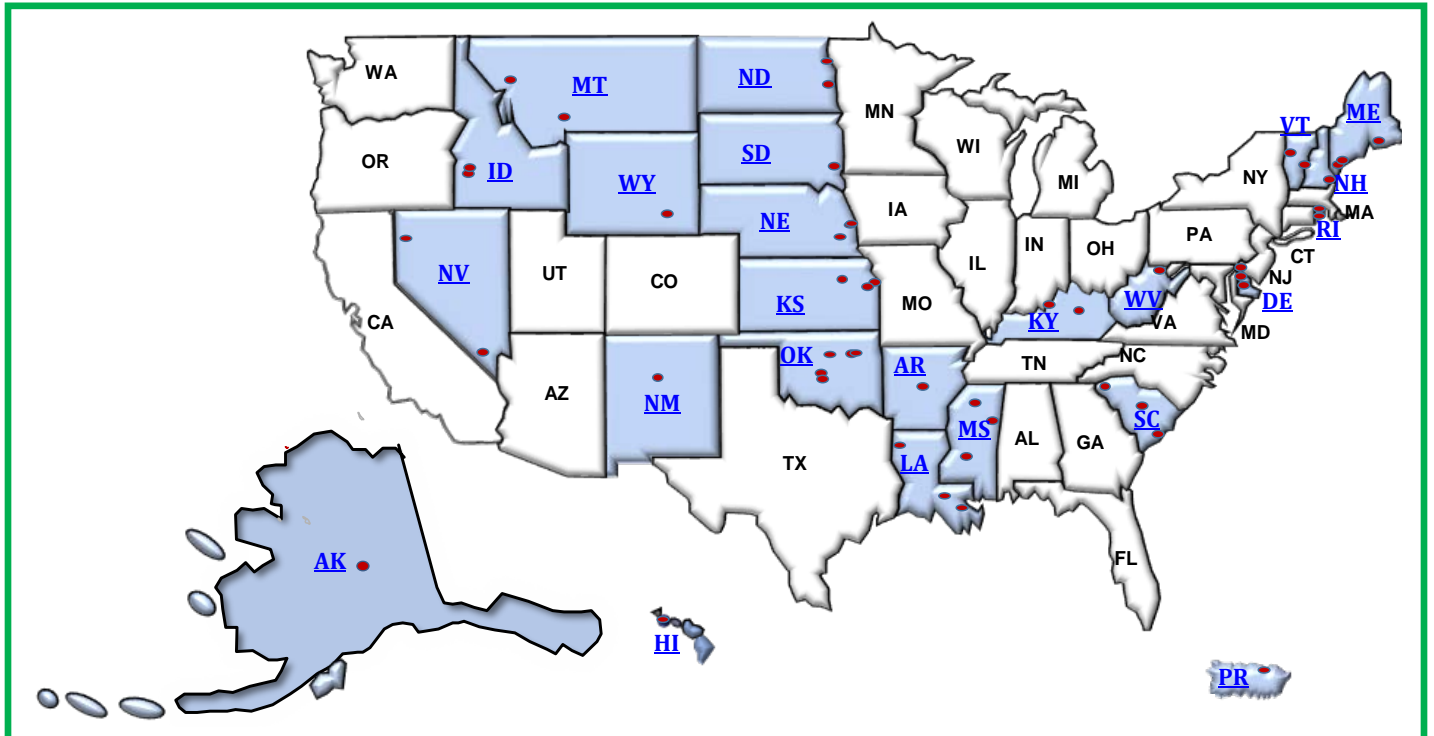
<u>State/Principal Investigator</u>	<u>Page</u>
Louisiana	38-46
<u>Cardin, Rhonda D.</u>	38
<u>Gettys, Thomas W.</u>	39
<u>He, Jiang</u>	40
<u>Jazwinski, S. Michal</u>	41
<u>Kapusta, Daniel R.</u>	42
<u>Navar, Luis Gabriel</u>	43
<u>O'Callaghan, Dennis J.</u>	44
<u>Ochoa, Augusto C.</u>	45
<u>Reiss, Krzystof</u>	46
Maine	47-51
<u>Friesel, Robert E.</u>	47
<u>Liaw, Lucy</u>	48
<u>Meng, Ian</u>	49
<u>St. Germain, Donald L.</u>	50
<u>Strange, Kevin</u>	51
Mississippi	52-56
<u>Hall, John E.</u>	52
<u>Majumdar, Soumyajit</u>	53
<u>Pruett, Stephen B.</u>	54
<u>Reckelhoff, Jane F.</u>	55
<u>Stockmeier, Craig A.</u>	56
Montana	57-60
<u>Adams, Alexandra K.</u>	57
<u>Holian, Andrij</u>	58
<u>Quinn, Mark T.</u>	59
<u>Sprang, Stephen R.</u>	60
Nebraska	62-71
<u>Becker, Donald</u>	62
<u>Bronich, Tatiana</u>	63
<u>Johnson, Keith R.</u>	64
<u>Leibold, Lori</u>	66
<u>Smith, Shelley D.</u>	67
<u>Stergiou, Nick</u>	68
<u>Takacs, James M.</u>	70
<u>Zempleni, Janos</u>	71

Table of Contents

<u>State/Principal Investigator</u>	<u>Page</u>
Nevada	73-75
<u>Cummings, Jeffrey L.</u>	73
<u>Sanders, Kenton M.</u>	74
<u>Webster, Michael A.</u>	75
New Hampshire	76-80
<u>Cote, Rick H.</u>	76
<u>Green, William R.</u>	77
<u>Karagas, Margaret R.</u>	78
<u>Madden, Dean R.</u>	79
<u>Stanton, Bruce A.</u>	80
New Mexico	81-86
<u>Calhoun, Vince</u>	81
<u>Deretic Vojo</u>	83
<u>Liu, Ke Jian</u>	84
<u>Loker, Eric S.</u>	85
<u>Shuttleworth, Claude W.</u>	86
North Dakota	87-92
<u>Geiger, Jonathan D.</u>	87
<u>Mallik, Sanku</u>	88
<u>McCourt, Mark E.</u>	89
<u>Sharma, Jyotika</u> (contact)	90
Bradley, David S.;	
Combs, Colin K.	
<u>Sibi, Mukund P.</u>	91
<u>Vaughan, Roxanne A.</u>	92
Oklahoma	93-103
<u>Dhanasekaran, Danny N.</u>	93
<u>Gaffney, Patrick M.</u>	94
<u>Hays-Grudo, Jennifer</u>	95
<u>James, Judith</u>	96
<u>Liu, Lin</u>	97
<u>Ma, Jian-Xing (Jay)</u>	99
<u>McEver, Rodger P.</u>	100
<u>Paulus, Martin P.</u>	101
<u>Thompson, Linda F.</u>	102
<u>West, Ann</u>	103
Puerto Rico	104
<u>Miller, Mark W</u>	104

<u>State/Principal Investigator</u>	<u>Page</u>
Rhode Island	105-113
<u>Chen, Qian</u>	105
<u>Quesenberry, Peter J.</u>	106
<u>Ramratnam, Bharat</u>	107
<u>Rand, David M.</u>	108
<u>Rothman, Alan L.</u>	109
<u>Rounds, Sharon Irene S.</u>	110
<u>Sanes, Jerome N.</u>	111
<u>Sharma, Surendra</u>	112
<u>Shaw, Sunil K.</u>	113
South Carolina	114-123
<u>Berger, Franklin G.</u>	114
<u>Kautz, Steven A.</u>	115
<u>Markwald, Roger R.</u>	117
<u>Nagarkatti, Prakash S.</u>	118
<u>Ogretmen, Besim</u>	119
<u>Roninson, Igor B.</u>	120
<u>Temesvari, Lesly A.</u>	121
<u>Tew, Kenneth D.</u>	122
<u>Vyavahare, Naren R. (contact)</u>	123
Markwald, Roger	
South Dakota	124-126
<u>Miskimins, W. Keith</u>	124
<u>Pearce, David A.</u>	125
<u>Thompson Paul A.</u>	126
Vermont	127-129
<u>Budd, Ralph C.</u>	127
<u>Higgins, Stephen T.</u>	128
<u>Irvin, Charles G.</u>	129
West Virginia	130-131
<u>Gibson, Laura F.</u>	130
<u>Simpkins, James W.</u>	131
Wyoming	132-133
<u>Flynn, Francis W.</u>	132
<u>Sun, QianQuan</u>	133

Location of COBRE Lead Institutions



Press Ctrl + Click on 2-letter state name to follow link to the list of principal investigators.

Centers of Biomedical Research Excellence (COBRE). The COBRE program strengthens biomedical or behavioral research capacity in institutions from IDeA states. COBRE phase 1 provides support to develop research infrastructure and to foster independence of junior investigators. COBRE phase 2 continues the progress toward building an independent research center that is competitive for receiving research support from NIH or other funding agencies. The COBRE Phase 3 awards (Transitional Centers) are intended to (1) provide support for maintaining COBRE research cores developed during phases I and II that are essential for the continuing conduct of basic, clinical, translational research, and/or community based research at the institution, and (2) sustain a collaborative, multidisciplinary research environment for research pilot projects and mentoring and training components. Red circles (●) are zip locations of COBRE lead institutions.

[Back to top](#)

P30GM103325- Phase 3**Investigating Obesity and Chronic Disease-Related Risk Factors of Alaska Natives****University of Alaska Fairbanks****Thematic Scientific Focus**

Obesity and chronic disease-related risks, youth suicide and substance abuse of Alaska Natives

Pilot Studies

- Development of a computerized adaptive testing program for Alaska Natives
- Exploring how Alaska Native cultural values are interconnected with cancer
- Attitudes toward alcohol misuse programs among Alaska Native college students
- Cultural adaptation of an intervention to reduce body weight in Yup'ik women
- Disruptive link: obesity and diabetes in Alaska Native Yup'ik people
- Validating carbon isotope ratio of breath CO₂ as biomarker of recent added sugar
- Prenatal preventive health in interior AK: impacts of maternal stress and health

Research Resources

- Experimental design, biostatistics and data services core
- Community engagement and clinical support core
- Nutrition and physical activity core

Index Terms

Alaska Native, obesity, metabolic disease, suicide, substance abuse, community-based participatory research

[Back to top](#)

P30 GM110702- Phase 3
Center for Translational Neuroscience
University of Arkansas for Medical Sciences

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Thematic Scientific Focus

Translational neuroscience research

Pilot Studies

- Transcranial magnetic stimulation as treatment for acutely suicidal inpatients
- Leptin signaling pathways regulating translation of neuropeptide receptor mRNAs
- Anti-inflammatory therapeutics for neuropathology in models of FASD
- Small molecule inhibitors of glioblastoma cancer stem cell self-renewal
- Cerebrovascular TRPC3 Channel and Status Epilepticus

Research Resources

- Human Electrophysiology core
- Animal Electrophysiology core
- Image Analysis
- Transcranial Magnetic Stimulation (TMS) core
- Molecular Biology core
- Behavioral core
- Telemedicine core

Index Terms

obesity, neurological disorders, psychiatric disorders, epilepsy, FASD

[Back to top](#)

P20GM109005- Phase 1
Center for Studies of Host Response to Cancer Therapy
University of Arkansas for Medical Sciences

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Thematic Scientific Focus

Conducting research into the mechanisms of side effects of cancer therapy and developing strategies to prevent them

Research Projects

- The Role of Tetrahydrobiopterin (BH4) in Radiation-Induced Skin Injury
- Molecular Mechanisms of C/ebp delta in Ionizing Radiation Response
- Epigenetic Alterations Caused by Low-Dose Ionizing Radiation
- Development of Novel Tocotrienol-based Radioprotective Agents

Pilot Studies

- Doxorubicin cardiotoxicity with sulforaphane in breast cancer patients
- Mitigating the side effects of cancer therapy through Syk inhibition

Research Resources

- Administrative Core
- Cellular and Molecular Analytic Core
- Irradiation and Animal Core

Index Terms

cancer survivors; uncomplicated cancer cures; cancer therapy toxicity; radiation toxicity; chemotherapy toxicity; radiation protectors

[Back to top](#)

P20GM103625- Phase 2
Center for Microbial Pathogenesis and Host Inflammatory Responses
University of Arkansas for Medical Sciences

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Thematic Scientific Focus

Microbial pathogen-human host interaction and the disease process

Research Projects

- Evaluating key steps in the progression of pneumonic plague
- Memory CD4 T cell responses in *Chlamydia* female reproductive tract infection
- Defining global gene regulation and virulence determinants of relapsing fever spirochetes
- Dysbiosis-induced impairment of tumoral leukocyte extravasation

Pilot Studies

- Characterization of the human lung response to pulmonary bacterial pathogens
- Defining cellular origins of latent gammaherpesvirus infection
- Elucidating the role of myeloid cells in lymphangiogenesis during *Leishmania* infection

Research Resources

- Administrative and scientific development core
- Research and technical advancement core
- DNA sequencing core
- Flow cytometry core
- Cellular imaging core
- Molecular biology core
- Proteomics core

Index Terms

Infection, pathogenesis, innate immunity, adaptive immunity, bacteria, viruses, parasites, malaria, reovirus, herpesvirus, oncolysis, inflammation, host response

[Back to top](#)

P20GM121293- Phase 1
Center for Translational Pediatric Research (CTPR)
Arkansas Children's Research Institute

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Thematic Scientific Focus

Using systems biology approaches to study how pediatric diseases develop with the ultimate goal of identifying targets for therapeutic intervention and the development of new treatments for children

Pilot Project

- A systems analysis of airway hyper-responsiveness in precision cut slices from donors with asthma

Research Projects

- Translational Regulation in Normal Erythropoiesis and Diamond Blackfan Anemia
- Effects of Maternal Obesity on Offspring Brain Development
- Role of Infant Diet in Gastrointestinal Tract and Immune System Development
- Microbiome-Derived Therapeutic Targets for Chronic Kidney Disease

Research Resources

- Administrative Core
- Proteomics Core
- Genomics Core
- Systems Biology Bioinformatics Core

Index Terms

pediatric, translational, cancer, systems biology, bioinformatics, proteomics, genomics

[Back to top](#)

P20GM109096- Phase 1
Center for Childhood Obesity Prevention
Arkansas Children's Hospital Research Institute

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Thematic Scientific Focus

Development of an integrated, interdisciplinary and translational center for childhood obesity prevention in Arkansas to prevent the rise in childhood obesity rates

Pilot Studies

- FGF-21: An adjunct biomarker for early detection of NAFLD in children
- Probiotic supplementation in obese pregnant women – A feasibility study
- Maternal obesity and offspring cardiovascular health
- Supporting implementation of obesity prevention practices in childcare

Research Projects

- Informing policies to address childhood obesity: A systems approach
- Breakfast, energy metabolism, and skeletal muscle health in children
- Assessment of oxidative capacity in obese children

Research Resources

- Administrative and Scientific Support Core A
- Biostatistics and Informatics Core B
- Metabolism Core C

Index Terms

childhood obesity, prevention, communities, environmental risk factors, energy metabolism, risk behaviors, diabetes, NAFLD, nutrition, physical activity, systems science, maternal obesity, cardiovascular health

[Back to top](#)

P30GM103333- Phase 3
Osteoarthritis: Prevention and Treatment
Delaware Rehabilitation Institute, University of Delaware

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Thematic Scientific Focus

Prevention and treatment of osteoarthritis

Pilot Studies

- Improving rehabilitation after total hip arthroplasty
- Acceleration-based assessment of limb loading asymmetry during daily living

Research Resources

- Patient-specific modeling core
- Cytomechanics core
- Clinical research core
- Clinical Research Core

Index Terms

biomechanics, orthopedics, physical therapy, magnetic resonance imaging, ultrasound, electromyography, elastography, confocal microscopy, tissue engineering, gait analysis

P20GM113125– Phase 1
Center of Biomedical Research Excellence in Cardiovascular Health
University of Delaware

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Thematic Scientific Focus

To establish a Center of Biomedical Research Excellence in Cardiovascular Health that aims to catalyze cardiovascular health research by fostering the independent research careers of a team of subproject new investigators, leading to sustainable funding

Research Projects

- Bone Marrow Capillary Redistribution with Advanced Age
- Mechanisms contributing to hypertension in postmenopausal women
- Interaction of Dietary Potassium with High Dietary Sodium on the Vasculature of Humans
- Interventions to improve cardiovascular health and fitness and walking function and activity after stroke
- Reduced endothelial function, brain, and cognition

Research Resources

- Delaware Biotechnology Institute Bio-Imaging Core
- University of Delaware Resources

Index Terms

cardiovascular health, blood pressure, hypertension, bioimaging, vascular physiology, sodium, , diet, smoking, muscular dystrophy

P30GM104316- Phase 1
Discovery of Chemical Probes and Therapeutic Leads
University of Delaware

Principal Investigator

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Thematic Scientific Focus:

COBRE will create new libraries for high-throughput screening, provide new perspectives on innate immune response and neurodegenerative disease, enable new screening technology, and advance the state of the art in virtual screening.

Research Projects:

- Development of an immunostimulatory small molecule library
- Studying regulators of breast cancer cell activation in dynamic, 3D microenvironments toward discovery of new drug candidates
- New synthetic methods for diverse small molecule library preparation
- Electrochemical chemiluminescent arrays and emitters for rapid chemical probe identification
- Realizing the predictive promise of high throughput virtual screening
- Synthesis of anticancer natural products
- ADAM9 in tumor progression

Pilot Studies

- Ultrafast Spectroscopy of Photosensitizers for Photodynamic Therapy
- Development of a nanoparticle-based theranostic agent to treat IBC metastasis

Research Resources

- High throughput synthesis
- Rapid purification of molecular libraries.
- Chip-based printing and assaying of molecular libraries
- High throughput assessment of cellular response to small molecules
- Computational core for high-throughput virtual screening and molecular structure optimization.

Index Terms

chemical probe, drug discovery, virtual screening, molecular discovery

[Back to top](#)

P20GM103653- Phase 2
COBRE: The Delaware Center for Neuroscience Research
Delaware State University

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Thematic Scientific Focus

Lifetime brain development and neuronal plasticity

Research Projects

- Identifying Adaptive and Maladaptive Responses in the Human Connectome to Inhibitory Control Challenges
- Paradoxical effects of estrogen in stress susceptibility
- Inducible TDP-43 expression and the functional relationship between memory, network connectivity, and pathology
- Identifying a therapeutic target and a biomarker in Parkinson's disease mice

Research Resources

- Rodent housing facility
- Imaging core

Index Terms

neuroscience, developmental biology, epigenetics, molecular neuroscience, fetal alcohol spectrum disorder, invertebrate models of learning, models of aging

[Back to top](#)

P30GM110758 – Phase 3
Molecular Design of Advanced Biomaterials
University of Delaware

Principal Investigator

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Thematic Scientific Focus

Molecular design of advanced biomaterials

Pilot Studies

- Collagen-based targeting for improved treatments of musculoskeletal pathologies
- Neuroscience animal behavior testing core (NABT)

Research Resources

- Mass Spectrometry and Surface Characterization (MSSC) Core
- Nuclear Magnetic Resonance (NMR) Core
- Microscopy and Mechanical Testing (MMT) Core
- Computational Modeling Core

Index Terms

biomaterial, biopolymer, biomimetic, hydrogel, protein, DNA, PNA, surface, surface analysis, molecular design, materials science, engineering, chemistry, biochemistry, chemical engineering, nanomaterials, organic chemistry, protein patterning, surface patterning, synthetic chemistry, photochemistry, NMR, XPS, TOF-SIMS, AFM, PCR, molecular modeling, drug delivery, drug payload

[Back to top](#)

P30GM114736-Phase 3
Center for Pediatric Research (CPR)
Alfred I. duPont Hospital for Children

Principal Investigator

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Thematic Scientific Focus

Pediatric disorders, therapies, neurological disorders

Pilot Studies

- Evaluation of mechanical ventilation strategies on neonatal tracheal mechanics
- Trajectories of change in BMI status in early childhood
- Using dynamic elbow ultrasound to identify the effect of pitching on the structural and functional anatomy of the ulnar collateral ligament in youth baseball players
- Multi-component beta-hairpin hydrogels for stem cell therapy of spinal cord injury
- IGF-1R inhibition indices EGFR expression in osteosarcoma and Ewing sarcoma through a noncanonical EGFR/MAPK signaling pathway-mediated by an Sp1-based transcriptional mechanism
- Transpyloric feeding and micro-aspiration-induced lung injury in preterm infants
- Development of novel screening assays to identify *SMN2* inducers
- From signal to symbol: Where is the auditory deficit?

Research Resources

- Clinical research services
- Cell science core
- Biomolecular core
- Bioinformatics core
- High-Throughput Screening and Drug Discovery Laboratory

Index Terms

pediatric diseases, neuroscience, therapy, prevention

[Back to top](#)

P20GM109021- Phase 1
The Delaware Comprehensive Sickle Cell Research Center
Alfred I. Du Pont Hospital for Children

Principal Investigator

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Thematic Scientific Focus

The research focus of this Center of Biomedical Research Excellence spans basic and translational science and addresses some of the major clinical aspects of sickle cell disease

Research Projects

- Gene editing of the beta globin gene using TAL effector nucleases and single stranded oligonucleotides.
- Phase 1/2 clinical trial of the n-3 omega fatty acids in pediatric sickle cell disease related pain and inflammation
- Screening for psychosocial risk in pediatric sickle cell disease using the Psychosocial Assessment Tool (PAT)

Pilot projects

- Genetic risk and markers of early kidney disease in children with sickle cell disease
- *In vitro* growth of Stem cells on nanofiber scaffolds
- Re-expression of fetal hemoglobin by gene editing as a therapy for sickle cell disease

Research Resources

- Clinical and Data Management Core
- Clinical Research Services
- Access to the Gene Editing Core, Center for Translational Cancer Research, the Helen F Graham Cancer Center, Christiana Care Health System, DE
- Access to Bioinformatics and Cell Science Cores of companion COBRE at Alfred I duPont Hospital for Children

Index Terms

sickle cell disease, hemolytic anemia, hemoglobinopathy, pain crisis, vasocclusive crisis, pediatric disease, complications of Sickle cell disease, gene editing, omega3 Fatty Acids, psychosocial assessment tool, renal disease chronic, stem cell growth *in vitro*, sickle cell clinical trials in sickle cell disease.

[Back to top](#)

GM113134- Phase 1
COBRE-Diabetes
University of Hawaii At Manoa

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Thematic Scientific Focus

Diabetes etiology: pre-clinical and clinical studies

Research Projects

- TRPA1 physiology in diabetes, metabolic syndrome, and metabolism
- Impact of modulated exocyst activity on Glut4 trafficking in metabolic tissues
- Identifying the immunoepigenetic signature of type 2 diabetes
- The role of ABCC6 in diabetic vascular calcification

Research Resources

- Administrative and Mentoring Core
- Resource Core

Index Terms

diabetes, etiology, immunoepigenetics, animal model, cation channels, glucose transport, vascular dyslipidemia

[Back to top](#)

P30GM10334- Phase 3
COBRE III: Center for Cardiovascular Research
University of Hawaii at Manoa

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Thematic Scientific Focus

Molecular and cellular mechanisms underlying human cardiovascular diseases

Pilot Studies

- The Role of MicroRNA 302a in HDL metabolism and atherosclerosis
- ABCC6 transporter deficiency causes vascular calcification and atherosclerosis
- Characterization of biomarkers associated with coronary artery dilation and doxycycline treatment in Kawasaki disease

Research Resources

- Genomics Core (now coordinated and coalescing with the Cancer Center Genomics Core)
- Histology and Microscopy Core (now co-sponsored by our RCMI program)
- Mouse Phenotyping Core

Index Terms

cardiovascular disease, receptor-mediated signaling, fibroblast, atherosclerosis, hypoxia-inducible factor-1, gene expression, microbubble

P20GM103457- Phase 2
Institute for Biogenesis Research: COBRE
University of Hawaii at Manoa, John A. Burns School of Medicine

Principal Investigator

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Thematic Scientific Focus

Fertilization and early development

Research Projects

- Regulation of polarized exocytosis during epithelial differentiation
- The impact of assisted reproductive technologies on the long-term epigenetic regulation of neurodevelopmental genes associated with autism
- Linking maternal obesity and offspring cancer risks through integration of cord blood stem cell methylome and transcriptome
- The placenta-specific glucose transporter modulation: obesity, metabolic effects and fetal well-being
- Safe gene correction of spermatogonial stem cells using a targetable transposase

Research Resources

- Transgenic Mouse
- ICSI
- IVF Core

Index Terms

fertilization, embryo, early development, gametes, sperm, egg, stem cells, obesity, cancer

[Back to top](#)

P30GM1114737- Phase 3
Pacific Center for Emerging Infectious Diseases Research
University of Hawaii at Manoa

Principal Investigator

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Thematic Scientific Focus

Emerging infectious diseases in the Asia-Pacific region

Pilot Studies

- *In utero* pathogenesis of African and Asian Zika virus strains in guinea pig
- Innate immune mechanisms involved in protection against Ebola virus infection
- Role of zinc in *Mycobacterium tuberculosis* pathogenesis
- Three-dimensional Human testicular organoids: a novel tool to study Zika virus pathogenesis

Research Resources

- Bioinformatics Core
- Molecular and Cellular Immunology Core

Index Terms

emerging infectious diseases, tropical medicine, health disparities, pathogenesis, Zika virus, Ebola virus, hantavirus, *Mycobacterium tuberculosis*

[Back to top](#)

P30GM103324- Phase 3
Transitional Center for Research on Processes in Evolution
University of Idaho

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Thematic Scientific Focus

Research on the evolution of pathogens and parasites that affect human health through the development and spread of drug resistance, vaccine failures, pathogen host switching, and the emergence of new diseases.

Pilot Studies

- Directed evolution of the molecular chaperone Hsp90 and its clients
- A novel system for the genetics of inflammation and cancer

Research Resources

- Computational Resources Core
- Genomics Resources Core
- Optical Imaging Core

Index Terms

evolutionary biology, molecular biology, structural biology, microbial ecology, computational biology, statistics, genomics, proteomics

[Back to top](#)

P20GM109095- Phase 1

Center of Biomedical Research Excellence in Matrix Biology
Boise State University

Principal Investigator

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Thematic Scientific Focus

Extracellular matrix in development and disease

Research Projects

- Potential MGP negative feedback loop mediated by BMP, Notch, and Runx2
- Computational and experimental study of wound repair in ligament
- AhR signaling during myofibroblast differentiation and fibrosis
- OSM promotes breast tumor cell-ECM disruption resulting in invasion and metastasis
- Nucleoskeletal regulation of chromatin dynamics and cell fate in response to mechanical signals
- Mechanisms for matrix-dependent BBB dysfunction during neuroinflammation

Pilot Studies

- *Staphylococcus aureus* surface adhesins as key vaccine candidates to prevent interaction with the host extracellular matrix
- 2D crystals as extracellular matrix for cell growth and differentiation
- VPS35 D620N inhibits autophagy through disrupted hyaluronic acid-CD44
- The role of LARP6-mediated collagen mRNA transport in fibrosis
- ApoE fragmentation by matrix metalloproteinase 9 in Alzheimer's Disease
- Molecular probes to understand hedgehog pathways signaling in basal cell carcinoma
- ECM production in response to plasma generated nitric oxide for chronic wound care
- Blocking signaling of the extracellular matrix-resident and tumor cell-produced OSM
- Chemical tools to modulate quorum sensing in *Pseudomonas aeruginosa*

Research Resources

- Biomolecular Research Core
- Biomedical Research Vivarium

Index Terms

extracellular matrix, collagen, liver fibrosis, cancer metastasis, ligament repair, cardiovascular disease, biomaterials, regenerative medicine, tissue engineering, blood-brain-barrier, neuroinflammation, mechanotransduction

[Back to top](#)

P20GM109007- Phase 1**Idaho Biomedical Research Collaborative in Emerging/Reemerging Infectious Disease
Idaho Veterans Research and Education Foundation****Principal Investigator*****Dennis Stevens, MD, PhD****Chief, Infectious Diseases**Idaho Veterans Research and Education Foundation**500 West Fort Street**Boise, ID 83702-0000**Tel: 208-422-1599**E-mail: dlsteven@mindspring.com**Web: http://ivref.org/index.php?option=com_content&view=article&id=62&Itemid=143***Thematic Scientific Focus**

Discovery, development and advancement of novel approaches to prevention, diagnosis and treatment of severe life-threatening infections

Research Projects

- Interplay of exotoxins driving and augmenting *C. difficile* and *C. sordellii* leukemoid reactions
- Impact of antibiotics on growth cycle and toxin production in *S. aureus*
- Generation of fully-human recombinant anti-toxin antibodies for treatment of necrotizing infections

Research Resources

- Administrative Core
- Histology/Pathology/Imaging Core (HPIC) Facility
- Cell Isolation & Characterization Core
- Molecular Biology Core
- Microbiology Core
- Protein Core
- Tissue Culture Core
- Boise VA Medical Center Infectious Diseases Laboratory, Bldg 117
- Boise VA Medical Center: Vivarium and *In Vivo* Animal Imaging Core, Bldg 109

Index Terms

infectious diseases, communicable diseases, pathogenesis, diagnosis, histology, novel strategies, bacteria, antibiotics, cellular immunology, bioinformatics, influenza, microbiology

[Back to top](#)

P20GM104420- Phase 1
Center for Modeling Complex Interactions
University of Idaho Moscow

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Thematic Scientific Focus

The Center for Modeling Complex Interactions focuses on biomedical problems that are complex and require too diverse a skill set to be tackled by lone specialists. It brings together empirical scientists and modelers to address problems across all levels of biological organization, from biophysical to ecological. The initial projects in the Center will focus on viral co-infection. Working Groups bring together modelers and empiricists to study a variety of problems ranging from using molecular modeling to predict immune escape mutations and spectral shifts in opsin proteins; modeling how human social dynamics such as attitudes toward vaccine generates feedbacks with disease dynamics; using microbiome data to model population dynamics of microbial communities; and modeling the reproducibility crisis in science.

Research Projects

- Disease severity during viral co-infection
- Multi-level dynamics of viral co-infection
- Agent-based modeling of viral co-infection

Pilot Studies

- Modeling variability in persistence induced from within by a toxic metabolite
- Multi-scale model of interaction between lung and pulmonary ventilation
- Modeling and evaluation of physical therapy movements using machine learning

Research Resources

- Mathematical Modeling Core Facility

Index Terms

mathematical modeling, viral co-infection, agent based modeling, molecular dynamic modeling, bioinformatics, respiratory virus, *Drosophila* virus

[Back to top](#)

P20GM104936 – Phase 2
Molecular Regulation of Cell Development and Differentiation
University of Kansas Medical Center, Kansas City

Principal Investigator

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Thematic Scientific Focus

Regulation of cell development and differentiation; developmental abnormalities and diseases

Research Resources

- Transgenic, Gene Targeting, and Genotyping Core
- Molecular Profiling Core
- High Resolution Imaging Core

Index Terms

aging, development, diabetes, differentiation, oogenesis, organogenesis, developmental biology, next generation sequencing, bioinformatics; molecular profiling

[Back to top](#)

P30GM110761- Phase 3
Protein Structure and Function
The University of Kansas Lawrence

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Thematic Scientific Focus

Health-related basic research in protein structure and function

Pilot Studies

- Characterizing and developing inhibitors of proteasome assembly
- Structure dynamics of cofactor binding human aldolase
- Screening of crystallization conditions of human LOXL2 and fragment library screening of its specific inhibitors
- Conformational switching in diphtheria toxin translocation (T) domain
- Targeting the malarial presenilin homolog
- Fragment-based discovery of probes for Musashi-2
- Fragment dissection of the maintenance of genetic variation in immune genes
- Structure function analysis of tumor suppressor APC protein
- Inhibition of polysialyltransferase ST8Sia II: A novel approach toward prevention of cancer metastasis
- Structure function of a bacterial lipoprotein secretion chaperone
- Understanding conformational control of nitric oxide synthase activity
- Fast processes in optogenetic systems: Experiments and modeling interaction between Rift Valley fever virus glycoprotein and heparin sulfate

Research Resources

- Protein Production Core Laboratory
- Protein Structure Core Laboratory
- Biomolecular NMR Core Laboratory

Index Terms

protein purification and production, protein structure, protein-protein interactions, protein X-ray crystallography, bio-molecular NMR spectroscopy, fragment-based drug design, antimicrobials based on protein targets, vaccines through protein stabilization

[Back to top](#)

**P30GM18247- Phase 3
Mechanisms of Liver Injury and Diseases
University of Kansas Medical Center**

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Thematic Scientific Focus

Nuclear receptors and their role in liver health and disease

Pilot Studies

- Heat shock proteins and mitochondrial function in the prevention of NAFLD
- Novel strategies to suppress inflammation and tumor progression in liver
- The role of PRMT1 in the susceptibility of bacterial infection in cirrhosis
- Development of a liver-on-chip technology for study of liver disease

Research Resources

- Cell Isolation Core
- Analytical Core
- Histopathology Core

Index Terms

bile acids, nuclear receptors, biomedical research, liver, liver dysfunction, liver function, liver repair, fatty acid glycerol esters, glucose, lipids, OCT1, ligand binding, metabolic syndrome, Type 2 diabetes, sortilin 1, diabetic dyslipidemia, alcohol, hepatic fibrosis

[Back to top](#)

P20GM113109-Phase 1
Cognitive and Neurobiological Approaches to Plasticity (C-NAP) Center
Kansas State University

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Thematic Scientific Focus

Cognitive and neural mechanisms of plasticity using a range of approaches, with research clusters on aging and neurodegeneration, comparative/translational neuroimaging, and the neurobiology of reward and decision.

Research Projects

- Plasticity in aging and memory for everyday activities
- Rearing-induced plasticity and incentive motivation for ethanol
- Plasticity in flexible goal-directed action
- Neuronal plasticity of older adults: perceptual learning in driving-related visual functions

Research Resources

- Behavioral Neuroscience Research Core
- Neuroinformatics Core
- Driving Simulator Research Core

Index Terms

cognitive, neurobiology, neuronal plasticity, neuroinformatics, animal model, neuroimaging

[Back to top](#)

P20GM103638- Phase 2
Molecular Analysis of Disease Pathways
University of Kansas Lawrence

Principal Investigator

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Thematic Scientific Focus

Genetic, biochemical and physical analysis of disease

Research Projects

- Alternative functions for $\gamma\delta$ T cells in the immune response to *Mycobacterium*
- Antibiotic-induced virulence in *Burkholderia pseudomallei*
- Role of biomechanical cues for stem cell based myocardial infarction therapy

Pilot Studies

- Microfluidic engineering of immunogenic exosomes for personalized cancer vaccine
- An integrative platform for cell-resolution analysis of the acute-to-chronic transition in bacterial pathogens

Research Resources

- Genome Sequencing Core
- Synthetic Chemical Biology Core
- Microfabrication and Microfluidics Core

Index Terms

imaging, genomics, sequencing, zebrafish, *C. elegans*, model organisms, microfluidics, molecular probes, microfabrication, microfluidics, sensors, cancer, pulmonary disease, neurological disorders, genetic diseases, molecular biology, bioengineering, bioanalytical chemistry, neuroscience

[Back to top](#)

P30GM103326- Phase 3
Novel Approaches for Control of Microbial Pathogens
University of Kansas Medical Center

Principal Investigator

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Thematic Scientific Focus

Novel molecular mechanisms for controlling infectious agents and host antigens

Pilot Studies

- Viral and host factors regulate HSV-1 infection
- Alternate mechanisms behind AtlA-dependent biofilm formation in *S. aureus*
- The role of NKG2D in immunosurveillance of spontaneous lymphoma
- Airway epithelium response to *Parvovirus* infection

Research Resources

- X-Ray Crystallography Core
- Fermentation and Screening Core
- Flow Cytometry Core
- Luminex Core
- Signal Transduction Core
- Writing Core

Index Terms

pathogens, microbial infection, molecular structure, protein X-ray crystallography, mechanism-based enzyme inhibitors, drug development, cell mediated immune responses, development of the immune system

[Back to top](#)

P20GM113117- Phase 1
Chemical Biology of Infectious Disease
University of Kansas Lawrence

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Thematic Scientific Focus

Novel molecular mechanisms for controlling infectious agents and host antigens

Research Projects

- Developing chemical inhibitors of essential ICP0 functions in Herpes Viruses
- Synthesis and biological evaluation of benzophenanthridine alkaloid natural products and derivatives
- Chemical approaches towards understanding and preventing poxvirus infection

Pilot Projects

- Developing assays to identify inhibitors of Hfq of *Acinetobacter baumannii*
- The chemical biology of HSV gene expression
- A new experimental platform to analyze anti-gB antibodies in human B cells curtailing *Clostridium difficile* virulence

Research Resources

- Core A: Administrative Core
- Core B: Infectious Disease Assay Development
- Core C: Computational Chemical Biology
- Core D: Synthetic Chemical Biology

Index Terms

communicable diseases, pharmaceutical chemistry, infectious disease treatment, novel, multidisciplinary, pathway interactions, infectious agents, effective therapy, intervention, pathogenesis

[Back to top](#)

P20GM103492- Phase 2
Center for Excellence in Diabetes and Obesity Research
University of Louisville

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Thematic Scientific Focus:

Molecular, cellular, experimental, epidemiological, and clinical investigations into the cardiovascular causes and consequences of diabetes and obesity.

Research Projects

- Local regulation of calcium influx in the vasculature during hyperglycemia
- CCR7 maintains systemic insulin resistance and adipose tissue inflammation in obesity
- Innate immunity in the diabetic heart
- Metabolomic analysis of atherothrombosis

Research Resources

- Flow Cytometry Core
- Pathology and Bioanalytical Core
- Imaging and Physiology Core
- Animal Models and Phenotyping Core

Index Terms

diabetes, obesity, cardiovascular, carnosine, heart, immunity, lipid metabolism, oxidative stress, particulate matter, nitric oxide, endothelial progenitor cells, atherothrombosis, atherosclerosis

[Back to top](#)

P20GM103527- Phase 2
Center of Research in Obesity and Cardiovascular Disease
University of Kentucky

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Thematic Scientific Focus

Mechanisms linking obesity to cardiovascular diseases

Research Projects

- Role of adipocyte prorenin receptor in obesity and hypertension
- Apolipoprotein E and energy substrate metabolism
- Circadian disruption and atherosclerosis
- Adipose tissue gamma delta T cells in aging and obesity
- Obesity and abdominal aortic aneurysms

Pilot Studies

- Myocyte ultra-structure and activation
- Role of adipose tissue on early life stress-promoted obesity hypertension

Research Resources

- Administrative Core
- Analytical Core
- Physiologic Core
- Pathology Core

Index Terms

obesity, cardiovascular diseases, diabetes, inflammation, hypertension, coronary artery disease, thrombosis, myocardial infarction, atherosclerosis.

[Back to top](#)

P30GM110787- Phase3
COBRE for the Center for Molecular Medicine
University of Kentucky

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Thematic Scientific Focus

Altered gene and protein expression in human disease

Pilot Projects

- Function of GIPC3 in hearing loss
- Role of MK2 following traumatic brain injury
- Single cell characterization of leukemia stem cells
- Structural and biochemical perspective of cell-wall biosynthesis in gram-positive bacteria
- Interplay between calcineurin, RCAN1, and tau in Alzheimer's disease

Research Resources

- Protein Analytical Core
- Organic Synthesis Core
- Genetic Technologies Core

Index Terms

protein production, protein x-ray crystallography, viral production, molecular cloning and engineering, small molecule synthesis, protein analysis and characterization, recombineering

P30GM110788- Phase 3
Center for the Biologic Basis of Oral/Systemic Diseases
University of Kentucky, College of Dentistry

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Thematic Scientific Focus

Biology of oral-systemic disease relationships

Research Resources

- Clinical Research Core
- Translational Diagnostics Laboratory Core:
- Pilot Project Core

Index Terms

oral infections, inflammation, translational research, atherosclerosis, gestational diabetes, pregnancy, chronic pain, innate immunity, inflammatory bowel disease, genetics, periodontal disease

P20GM113226- Phase 1
Hepatobiology and Toxicology COBRE
University of Louisville Research Foundation

Principal Investigator

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Thematic Scientific Focus

Mechanisms and therapy for liver injury, nutrition and gut, liver interactions, liver: environment/toxicant/drug interactions

Pilot Projects

- Epigenetic regulation of inflammatory chemokines in alcoholic liver disease
- Anti-carcinogenetic mechanism of FGF21 in early stage of hepatocellular carcinoma
- Dietary copper-fructose interactions alter gut microbiome/metabolome in a sex-variable manner contributing to the development of NAFLD

Research Projects

- Role of acrolein in hepatic ER stress and injury in alcoholic liver disease (ALD)
- Pathogenic role of PDE4 in hepatic stellate cell activation and TGF signaling
- Role of hepatocyte exosomes in high fat diet mediated promotion of liver cancer development
- Interaction between NAFLD and organochlorine exposure
- Effects of dietary fat on the hepatotoxicity of environmental arsenic

Research Resources

- Administrative Core
- OMICS Core
- Analytical Core
- Animal Model and Biorepository Core

Index Terms

liver diseases, liver injury, metabolism, obesity, alcoholic liver disease, drug interactions, hepatitis, molecular target, carcinoma, toxicant exposure, diabetes

[Back to top](#)

**P30GM106396- Phase 3
Molecular Targets Phase III COBRE
University of Louisville**

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Thematic Scientific Focus

Novel molecular targets for cancer therapy

Research Resources

- Microsequence Array Facility
- Molecular Modeling Facility
- Computational Resources
- NMR /Metabolomics Facility
- Comprehensive Protein Expression and Purification Laboratory
- Biophysics Facility

Index Terms

neoplastic transformation, cancer, molecular targets, drug development, cytokines, growth factors, kinases

P20 GM121327- Phase 1
University of Kentucky Center for Cancer and Metabolism
University of Kentucky

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Thematic Scientific Focus

Metabolomics, cancer, oncogenesis, biomarkers, therapy, interventions

Research Projects

- Vitamin D protecting against cachexia in cancer patients
- Serine biosynthesis pathway is basal-like breast cancer
- ROR α in breast cancer metastasis
- Fatty acid synthetase in colorectal cancer

Research Resources

- Metabolism Core
- Imaging Core

Index Terms

cancer, metabolism, oncogenesis, biostatistics, novel targets, metastasis, therapeutics, translational, intervention

[Back to top](#)

P30GM110760- Phase 3
Center for Experimental Infectious Disease Research
Louisiana State University A&M College, Baton Rouge

Principal Investigator

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Thematic Scientific Focus

Infectious diseases, molecular biology and pathogenesis of vector borne pathogens

Pilot Research Projects

- Mucosal response in human metapneumovirus Infection
- Sca1+ lung mesenchymal stem cell based intervention in bacterial pneumonia
- Novel models of axonal degeneration in lyme neuroborreliosis
- Modulation of anti-M. tuberculosis adaptive immune response – role of IDO
- High-throughput screening of CRISPR-Cas9 sgRNA library for host factors essential for HSV-1 replication

Research Resources

- Molecular Immunopathology Core (MIP)
- Protein Core Laboratory (PCL)
- GeneLab Core Facility

Index Terms

infectious diseases, microscopy, microbial, immunopathology

[Back to top](#)

P20GM103528- Phase 2
Mentoring Obesity and Diabetes Research in Louisiana
LSU Pennington Biomedical Research Center

Principal Investigator:

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Thematic Scientific Focus

Metabolic disease, obesity, and diabetes

Research Projects

- Gene-environment interactions and high-density lipoproteins: an integrated genomic, biological and behavioral approach
- The effects of oncostatin M on the adipose tissue extracellular matrix
- Thermoregulatory circuit mapping of preoptic leptin receptor neurons
- Dynamic regulation of β -cell function and mass by SGK1
- Role of FGF-21 in mediating the metabolic effects of dietary methionine restriction

Research Resources

- Cell Biology and Bioimaging Core
- Genomics Core
- Transgenics Core

Index Terms

insulin resistance, diabetes, obesity, metabolic syndrome, adipose tissue, adipogenesis

[Back to top](#)

P20GM109036- Phase 1

**Tulane COBRE for Clinical and Translational Research in Cardiometabolic Diseases
Tulane University of Louisiana**

Principal Investigator:

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Thematic Scientific Focus

Cardiovascular and genetic epidemiology, etiology, prevention and treatment, clinical trials, translational research, global health

Research Projects

- Effect of dietary sodium reduction in kidney disease patients with albuminuria
- Metagenomic analysis of human gut microbiota for sarcopenia
- Longitudinal change in obesity during childhood and adult cardiometabolic risk

Research Resources

- Clinical Research Core
- Methodology/Statistics Unit

Index Terms

cardiovascular, cardiometabolic diseases, glycemic control, diabetes, metabolomics, public health, risk factors, disorder prevention, multidisciplinary, evidence based intervention, inflammatory, community based participatory research

[Back to top](#)

P20GM103629- Phase 2
Mentoring Research Excellence in Aging and Regenerative Medicine
Tulane University of Louisiana

Principal Investigator

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Thematic Scientific Focus

Aging and regenerative medicine

Research Projects

- Molecular functions of set in chromosome stability and aging
- Multiscale computational tool to reduce the prevalence of age-related tendinopathy by resolving the key mechanisms of tendon dynamics
- Promoting skeletal regeneration in aged mice
- Role of innate immunity and microbiome in the inflammation of aging and long-term antiretroviral therapy

Research Resources

- Genomics and Biostatistics, and Bioinformatics Core

Index Terms

genetics, molecular and cell biology, signaling, immunology, stem cells, biology of aging, immunity, inflammation, metabolism, cell cycle, genetic stability, chromosome dynamics, mitochondrial function, mathematical modeling, connective tissue, microbiota, immunodeficiency virus, musculoskeletal system

[Back to top](#)

P30GM106392- Phase 3
Mentoring in Cardiovascular Biology
Louisiana State University Health Sciences Center-New Orleans

Principal Investigator

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Thematic Scientific Focus

Cardiovascular biology and cellular and molecular mechanisms involved in cardiovascular disease states

Pilot Projects

- Metabolic modulation as a therapeutic for vascularization-associated diseases
- Renal Nerve Ablation and Macrophages in SHR
- Identifying novel therapeutic leads against Chagas disease
- DNA repair-independent function of DNA-PK in vascular inflammation
- Therapeutic potential of renal denervation and stem cells in acute MI

Core Research Resources

- Cell and Molecular Analysis Core
- Imaging and Histology Core
- Cardiac and Vascular Function Core

Index Terms

cardiovascular disease, atherosclerosis, hypertension, heart failure, ischemic heart damage, oxidative stress, inflammation, cell signaling and trafficking, G protein-coupled receptors, acute/chronic renal failure, central nervous system, obesity, pulmonary function

[Back to top](#)

P30GM103337- Phase 3
Translational Research in Hypertension and Renal Biology
Tulane University School of Medicine

Principal Investigator

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Thematic Scientific Focus

Factors contributing to development of hypertension and subsequent consequences on renal and cardiovascular function

Research Projects

- TNF- α receptors in intrarenal angiotensinogen regulation during high salt intake
- Genetic basis of inflammation & cardiovascular dysfunction
- Novel mechanism of diabetic ketoacidosis

Research Resources

- Molecular, Imaging and Analytical Core
- Transgenic and Gene-targeted Animal Core
- Mouse Phenotyping Core
- Clinical and Translational Core

Index Terms

hypertension, blood pressure, renal, angiotensin, cardiovascular disease, kidney disease, nephropathy, kidney development, renal injury, TNF- α receptors, microvascular

[Back to top](#)

P30GM110703- Phase 3
COBRE Center for Molecular and Tumor Virology
Louisiana State University Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Molecular and tumor virology

Pilot Projects

- Role of Th17/Treg immunoregulatory axis in a viral model for multiple sclerosis
- The role of cullin RING ligases in rotavirus NSP1 IFN antagonist activity
- A novel HPV infection model allowing the genetic dissection of immediate early events
- Role of the varicella-zoster virus IE62 in viral replication

Research Resources

- Administrative Core
- Molecular Analysis Core
- Bioinformatics Core
- Genomic/DNA Array Core

Index Terms

virology, infectious agents, molecular pathogenesis, viral oncology

[Back to top](#)

P30GM114732- Phase 3
Mentoring Translational Researchers in Louisiana
Louisiana State University Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Immunobiology of disease with emphasis on chronic inflammation and tissue damage

Pilot Studies

- Myeloid-derived suppressor cells in patients with HIV/AIDS
- Polycyclic aromatic hydrocarbons and malignant transformation of neural progenitors

Research Resources

- Cellular Immunology and Immune Metabolism Core
- Translational Genomics Core
- Molecular Histopathology and Analytical Microscopy
- Grants and Development Core

Index Terms

inflammation, host defense, immune response, T cells, chronic disease, cancer

[Back to top](#)

P20GM121288-01 - Phase I
Center for Translational Viral Oncology (CTVO)
Louisiana State University Health Sciences Center

Principal Investigator

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School of Medicine

Professor, Director of Neurological Cancer Research

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Thematic Scientific Focus

Understanding of virus-host interactions that dysregulate cellular homeostasis and contribute to malignant transformation, and on the development of therapeutic approaches against virus-induced/associated cancers

Research Projects

- Role of HERV-K reactivation in AIDS-related Kaposi's sarcoma
- Human Papillomavirus in HIV-associated lung cancers
- Oncomodulatory role of HCMV in glial tumors
- Three-dimensional modeling of EBV-HPV interactions leading to anogenital cell dysplasia

Pilot Studies

- Role of MDSCs in HIV Cancers
- Role of MDSCs in JC Virus-associated CNS Tumors

Research Resources

- Administrative Core
- HIV Clinical Tumor Biorepository (HTCB) Core
- Molecular Histopathology Analytical Microscopy Core (MHAM)
- Cell Immunology and Metabolism Core (CIMC)
- Translational Genomics Core (TGC)
- Biostatistics/Bioinformatics Core (BBC)

Index Terms

Virus-induced cancer, HIV, HPV, EBV, KSHV, HCMV, JCV, HERV-K, glioblastoma, lung cancer, Kaposi's sarcoma, immunosuppression, cell cycle control, epigenetic regulation, gene expression, next generation sequencing.

[Back to top](#)

P30 GM106391- Phase 3
Phase III COBRE in Stem & Progenitor Cell Biology and Regenerative Medicine
Maine Medical Center

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Thematic Scientific Focus

Stem and progenitor cell biology and damaged tissue repair

Research Resources

- Progenitor Cell Analysis Core
- Molecular Phenotyping Core
- Histopathology Core
- Physiology Core

Index Terms

stem and progenitor cell biology, cytokine signal transduction, skeletal development, leukemogenesis, bone remodeling, nephrogenesis, adipogenesis, hematopoiesis, and erythropoiesis

[Back to top](#)

P20GM121301- Phase 1
Mesenchymal and Neural Regulation of Metabolic Networks
Maine Medical Center

Principal Investigator

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Thematic Scientific Focus

Mesenchymal cell-neural interactions and their relationship to obesity and osteoporosis; mesenchymal progenitors, their derivatives and neural cells

Research Projects

- Regulation of obesity through BMP signaling pathways in brown adipose tissue
- Novel mechanisms of osteocyte control of marrow adiposity
- Beta blockers and their impact on fracture risk in nursing home residents taking atypical antipsychotics
- Neural and metabolic mechanisms of atypical antipsychotic drug-induced bone loss

Research Resources

- Core A: Administrative and Professional Development Core
- Core B: Proteomics and Lipidomics Core
- Core C: Histopathology and Histomorphometry Core
- Core D: Physiology Core for the Mesenchymal and Neural Regulation of Metabolic Networks (PC-MN)

Index Terms

mesenchymal cells, neuroregulation, obesity, osteoporosis metabolic networks, bone loss, biochemical pathway, sympathetic nervous system, adipose deposits

[Back to top](#)

P20GM103643- Phase 2
Interdisciplinary Center of Excellence for the Study of Pain and Sensory Function
University of New England

Principal Investigator

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Thematic Scientific Focus

The neurobiology of chronic pain and sensory function

Research Projects

- Tissue resident macrophages in sensory ganglia: function and impact on nociception
- Genetic control of nociceptor anatomical plasticity in the adult peripheral nervous system
- The role of spinal disinhibition in cancer induced bone pain
- Painful neonatal trauma alters subsequent fear and sensory function via changes in amygdalar CRF function

Pilot Studies

- Resident DRG macrophages: Impact on nociceptor response
- Primary cilia in nociceptive DRG neurons: Potential links to acute and chronic pain
- Effects of early life pain on subsequent fear conditioning and sensory function
- Chronic pain, motor output and motor learning in knee osteoarthritis
- Mechanisms of infection-mediated pain
- Peripheral mechanisms of cancer-induced ongoing and breakthrough bone pain

Research Resources

- Administrative Core
- Histology and Imaging Core
- Behavioral Core

Index Terms

pain, nociception, neurobiology, sensory, behavior, neuropathology

[Back to top](#)

P30GM103392-Phase 3
Phase III COBRE in Vascular Biology
Maine Medical Center Research Institute

Principal Investigator

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Thematic Scientific Focus:

Vascular biology, remodeling, angiogenesis, and disease mechanisms

Pilot Projects:

- Role of Wnt-10b in the activation of cardiac endothelial cells by myeloid cells
- Role of alpha10beta1 integrin in angiogenesis

Research Resources:

- Structural Biology Core (Proteomics, DNA Sequencing, Confocal Microscopy)
- Transgenic Mouse and Small Animal Imaging Core
- Viral Vector Core

Index Terms:

structural biology, molecular biology, molecular genetics, angiogenesis, cell signaling, vascular biology, cancer, inflammation, endothelial cell, vascular smooth muscle cell, atherosclerosis, restenosis, FGF, Notch, TGF-beta, IGF, IGFBPs, integrins, cryptic epitopes

P20GM104318- Phase 1
Comparative Biology of Tissue Repair, Regeneration and Aging
Mount Desert Island Biological Laboratory

Principal Investigator

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Thematic Scientific Focus:

Mechanisms underlying natural tissue repair, regeneration and aging

Research Projects

- Genetic analysis of natural reprogramming during regeneration
- Regeneration of cutaneous axon regeneration by wound derived H₂O₂
- The role of germ granules in maintaining self-renewal and totipotency
- Stress, genomic instability, and loss of regenerative capacity with age

Pilot Project

- Involvement of MMP13 in peripheral diabetic neuropathy in zebrafish and mice

Research Resources

- Comparative Functional Genomics Core
- Animal Core

Index Terms

Regeneration, aging, development, tissue repair, stem cells, totipotency, pluripotency, bioinformatics, microRNA, comparative biology, health span, cellular plasticity, gene expression, stress biology

[Back to top](#)

P20GM104357-Phase 1
Cardiorenal and Metabolic Diseases Research Center
University of Mississippi Medical Center

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Thematic Scientific Focus:

Prevention, treatment and mechanisms of obesity, cardiorenal and metabolic diseases

Research Projects

- Differential control of metabolic and cardiovascular functions by leptin
- The role of matrix metalloproteinases in the progression of diabetes-induced renal injury
- Impact of nocturnal home blood pressure on cardiac structure and function

Pilot Projects

- Elucidating mechanisms responsible for the pathogenesis of preeclampsia using the Dahl salt sensitive rat as a novel model of preeclampsia
- Renal sinus fat, hypertension and altered renal hemodynamics
- Role of 20-HETE on aging and hypertension related cerebral vascular disease
- Molecular basis of post-ischemic maladaptation in the insulin resistant heart
- Novel roles of MMP-28 post-myocardial infarction

Research Resources

- Administrative, Mentoring and Education Core
- Bioanalytical, Mass Spectroscopy, Imaging and Histology Core
- Molecular/Genomics and Genetically Engineered Animal Models Core

Index Terms

cardiovascular, kidney, hypertension, obesity, metabolic syndrome, diabetes, genetics, central nervous system

[Back to top](#)

P20GM104932- Phase 2**Center of Research Excellence in Natural Products Neuroscience (CORE-NPN)****University of Mississippi****Principal Investigator*****Soumyajit Majumdar, PhD****Department of Pharmaceutics**University of Mississippi**111 Faser Hall**Oxford, MS 38677**Tel: 662-915-3793**E-mail: majumso@olemiss.edu**Web: <http://pharmacy.olemiss.edu/cobre/>***Thematic Scientific Focus**

Natural products to manage central nervous system disorders.

Research Projects

- Delta-8-Tetrahydrocannabinol in the management of glaucoma
- Fluorinated derivatives of anthocyanin natural products for brain neurodegeneration
- Intranasal delivery of ziconotide using muco-similar vehicles

Pilot Studies

- *In vitro* ligand screening by small molecule hydroxyl radical footprinting
- Identifying novel cannabinoid analogues for the treatment of Dravet syndrome

Research Resources

- Core A: Sourcing, Acquisition and Isolation Core
- Core B: Chemistry and DMPK Core
- Core C: *In Vitro* Pharmacology Core
- Core D: *In Vivo* Pharmacology Core
- Core E: Biopharmaceutics- Clinical and Translational Core

Index Terms

natural products, central nervous system, cannabinoids, pathophysiology, pharmacology, neurodegeneration, glaucoma, anthocyanins

[Back to top](#)

P20GM103646- Phase 1**Center for Biomedical Research Excellence in Pathogen-Host Interactions****Mississippi State University****Principal Investigator****Stephen B. Pruett, PhD**

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E-mail: Pruett@cvm.msstate.eduWeb: <http://www.cvm.msstate.edu/academics/departments-centers/center-of-biomedical-research-excellence>**Thematic Scientific Focus**

Pathogen-host interactions, systems biology

Research Projects

- Role of stress response in bile resistance of *Listeria monocytogenes*
- Functional analysis of deubiquitinating enzymes in enteric infections
- Identifying polyamine dependent mechanisms in pneumococcal pneumonia
- Molecular mechanisms of immunosuppression induced by superantigens
- Receptors determining influenza host and tissue tropisms using systems biology approaches

Pilot Studies

- Role of the PUMA gene product in pathogenicity of *Streptococcus pneumonia*
- Regulation of experimental autoimmune encephalitis by T cells induced by low doses of Staphylococcal toxins

Research Resources

- Omic Core Facility (Core B)
- Cellular Purification and Analysis Core (Core C)

Index Termspathogen, host, proteomics, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Shigella flexneri*, Influenza virus, *Staphylococcus aureus*, polyamines, superantigen, deubiquitinase, bile[Back to top](#)

P20GM121334- Phase 1
Mississippi Center of Excellence in Perinatal Research
University of Mississippi Medical Center

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Thematic Scientific Focus

Perinatal research and treatment, obesity and related metabolic factors during pregnancy; health disparities

Research Projects

- Role of obesity in preeclamptic pregnancy.
- Role of maternal bariatric surgery in programming cardio-metabolic disease in growth-restricted offspring
- Role of 17 β -hydroxysteroid dehydrogenase in the hypertension of PCOS
- Prenatal screening and mechanisms responsible for critical congenital heart disease in Mississippi, a rural and medically underserved population

Research Resources

- MS CEPR Administrative Core
- Core B

Index Terms

perinatal, disease states, maternal, health disparities, pregnancy outcomes, development, multidisciplinary, developmental origins of disease

[Back to top](#)

P30GM103328- Phase 3
Center for Psychiatric Neuroscience
University of Mississippi Medical Center

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Thematic Scientific Focus

Pathology of psychiatric, neuropsychiatric and degenerative neurological disorders including disorders of mood, alcohol and substance dependence

Pilot Projects

- Circadian regulation of drug reward: Diurnal rhythms in mesolimbic neural firing and drug-seeking
- HELLP Syndrome
- ShRNA-mediated suppression of gap junction protein Connexin 43
- Long-term consequences of in utero methamphetamine exposure
- The moderating role of genetics in the relation between PTSD and trauma cue-evoked cocaine attentional bias among cocaine dependent patients

Research Resources

- Postmortem Brain Collection Core
- Animal Behavior Core
- Imaging Core
- Molecular and Genomics Core

Index Terms

psychiatric neuroscience, depression, alcohol, psychoactive substance use disorders, schizophrenia, bipolar disorder, postmortem brain tissue, imaging, confocal microscopy, laser capture microdissection, deep sequencing, genomics, behavior, antidepressant medications, chronic stress, neurotrophic factors, angiogenic factors, serotonin, glutamate, transcription factors

[Back to top](#)

P20GM104417- Phase 1
Center for American Indian and Rural Health Equity (CAIRHE)
Montana State University - Bozeman

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Thematic Scientific Focus

Rural and native health equity

Research Projects

- The Fort Peck sexual health project
- Increasing access to oral health care: Evaluating the outcomes of a community health specialist program
- Increasing environmental health literacy in a Native American community

Pilot Projects

- The Fort Peck substance abuse and resilience project
- Multi-criteria evaluation of efficiency, access, and outcomes at health centers
- Promoting dietary quality at FDPIR through a fruit and vegetable intervention
- Rural Montana victims needs assessment
- Understanding substance use and DUI among rural young adults
- Understanding the relationship between sense of belonging and health in the Blackfeet tribal community

Research Resources

- Community Engagement Core

Index Terms:

Native health, rural health, health disparities, health equity, oral health, reproductive health, health literacy

[Back to top](#)

P30GM103338- Phase 3
Center for Environmental Health Sciences
University of Montana, Missoula

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Thematic Scientific Focus

Environmental agents on immune and neurological outcomes in human health and disease

Research Resources

- Inhalation and Pulmonary Physiology Core
- Molecular Histology and Fluorescent Imaging Core
- Fluorescent Cytometry Core

Index Terms

environmental health, toxicology, immunology, development, nanomaterials, asbestos, wood smoke, oxidative stress, carcinogenesis, receptor signaling, innate and adaptive immunity

[Back to top](#)

P30GM110732- Phase 3
Center for Zoonotic and Emerging Infectious Diseases
Montana State University-Bozeman

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Thematic Scientific Focus

Infectious disease pathogenesis and development of novel therapeutic treatments

Research Resources

- Cellular Analysis Core
- Animal Models Core

Index Terms

zoonotic diseases, infectious agents, bacterial pathogenesis, innate immunity, adaptive immunity, bone marrow failure, viral spreading, CRISPR

P20GM103546- Phase 2
Biomolecular Structure and Dynamics
The University of Montana

Principal Investigator

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Thematic Scientific Focus

Biophysical, structural and mathematical approaches in understanding health and disease

Research Projects

- Alteration of the phenotype and function of innate lymphoid cells by aryl hydrocarbon receptor ligands
- Ligand-specific dynamics and biased agonism in PPAR signaling
- Implementing biomimetic and bio-inspired strategies in the design of new catalytic systems for energy-demanding transformations
- Inhibition of retinoid acid metabolism in the brain for the treatment of traumatic brain injury
- Dissecting the determinants of has separation and function of stem cell regulator FBF-2

Pilot Projects

- Molecular specificity of system Xc- substrates
- Resolving the subunit composition of NMDA receptors in live cells
- Nanodisc affinity capillary electrophoresis: characterizing binding to lipid bilayers
- The interplay between the silk fibroin protein structure and its adhesive properties
- Molecular specificity of system Xc- substrates

Research Resources

- Macromolecular X-Ray Diffraction and Protein Expression Core
- Nuclear Magnetic Resonance Core Facility
- Molecular Computation Core Facility
- Biospectroscopy Core Research Laboratory
- Mass Spectrometry Core Facility

[Back to top](#)

Index Terms

biophysics, structural biology, structural studies, pathogens, mammals, fractionation, functional analysis, aryl hydrocarbon receptor, lymphoid cells, retinoic acid receptor, NMDA receptors, nanodiscs, silk fibroin, electrophoresis, catalysis, non-covalent interactions, organometallic chemistry, germ granules, mRNA, silencing, stem cells, cancer, diffraction, disease, isotopes, oxygen, glycoprotein, biological processes, crystallization, spectroscopy, biospectroscopy, spectrometry, cellular biology, pharmacology, neurobiology, biochemistry, synthetic chemistry, macromolecular X-ray crystallography, nuclear magnetic resonance spectroscopy, NMR, mass spectrometry, molecular computation, Markov models, sequence comparison

[Back to top](#)

P30GM103335- Phase 3
Redox Biology Center
University of Nebraska-Lincoln

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Thematic Scientific Focus

Reduction-oxidation biology in growth, development and health

Pilot Projects

- VAP-1 and its role in sympatho-excitation in Type 1 diabetes mellitus

Research Resources

- Metabolomics and Proteomics
- Spectroscopy and Biophysics
- NMR Metabolomics
- Electron Paramagnetic Resonance Spectroscopy
- Macromolecular Crystallography
- Bio-Imaging

Index Terms

redox biology, oxidative stress, redox signaling, reduction-oxidation, metabolism, redox regulation, mitochondria, reactive oxygen species, metal ion homeostasis, cancer, Parkinson's disease, aging, cataracts, cardiovascular disease, neurodegeneration

[Back to top](#)

P20GM103480 – Phase 2
Nebraska Center for Nanomedicine
University of Nebraska Medical Center

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Thematic Scientific Focus:

Nanotechnology in the development of diagnostic and therapeutic agents for human disease

Research Projects

- Development of metabolically-active linkers (MALS) to improve diagnostic and radiotherapeutic HPMA copolymers
- MUC4 based vaccine for pancreatic cancer
- Renal drug targeting for the treatment of lupus nephritis
- Role of nanoformulated redox enzymes in reducing systemic hypertension in obesity
- Multifunctional nanofiber skin graft for extensive skin replacement therapy

Pilot Studies

- Local sustained co-delivery of 25-hydroxyvitamin D₃ and parathyroid hormone-related peptide for prevention of surgical site infection
- Stable SERS-based multiplex nanosensors for early detection of cancer biomarkers
- Combination nanomedicines based on CXCR4 and microRNA inhibition to treat cholangiocarcinoma
- Synthesis of novel self-assembling biomaterials with antibacterial properties

Research Resources

- Nanomaterials Core Facility
- Bioimaging Core Facility

Index Terms

nanotechnology and engineering, biomaterials, polymer therapeutics, macromolecular prodrugs, radiopharmaceutics, drug delivery, vaccines, neuroscience, oxidative stress, cancer, lupus, obesity

[Back to top](#)

P30 GM106397 - Phase 3
Nebraska Center for Cellular Signaling
University of Nebraska Medical Center

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Thematic Scientific Focus

Signal transduction in cell biology and cancer biology

Pilot Grants

- Biochemical investigation of oxidative DNA damage response
- Interferon Response Factor-3 and the immune response to melanoma
- Prostaglandin E desensitization via phosphodiesterase-4 up-regulation in chronic obstructive pulmonary disease
- CD59 down-regulation as a strategy for cancer treatment
- Androgen Receptor promotes TRAIL resistance in breast cancer
- Targeting Rac1 for sensitization of breast cancer to radiation therapy
- Free fatty acids promote inflammation and dynamic regulation of lipid droplets
- Role of Mnt in lymphomagenesis
- YAP as a novel regulator in pancreatic cancer metastasis
- Modeling the role of the Hippo/YAP pathway in ovarian high grade serous carcinoma
- Role of endocytic regulatory proteins in mitochondrial fission and Parkinson's disease
- Targeting proteostasis for cancer treatment
- Dissecting the roles of EHD1 and EHD4 in the renal tubular epithelium
- Targeting proteostasis for cancer treatment.
- Control of colon tumor maintenance by TIMELESS and WDR5
- Regulation of Connexin43 by Pyk2 in cardiac hypertrophy
- Targeting Bcl-xl and Mcl-1 in colorectal cancer
- Cell-cell contact in prostate cancer progression
- Regulation of efferocytosis in tumor associated macrophages

[Back to top](#)

Research Resources

- Advanced Microscopy Core
- Tissue Sciences Core
- High Throughput Screening Facility
- Flow Cytometry Core
- Biostatistics Core
- Human Tissue Bank
- Protein Structure Core Facilities
- Translational Mouse Model Core
- Transgenic Mouse Facility
- Rapid Autopsy Program for Pancreatic Cancer
- Small Animal Imaging
- Epigenomics and DNA Methylation Analysis
- Mass Spectrometry and Proteomics

Index Terms

signal transduction, DNA damage, endocytosis, cell adhesion, prostate cancer, oral cancer

[Back to top](#)

P20GM109023- Phase 1
Center for Perception and Communication in Children
Father Flanagan's Boys' Home

Principal Investigator

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Thematic Scientific Focus:

Speech and language issues that are related to hearing loss in children

Research Projects

- Efficacy of a parent-implemented early intervention addressing the needs of children with hearing loss
- Cognitive mechanisms that facilitate speech comprehension in listeners with cochlear implants
- Individual differences in long-term retention of word learning during the preschool years

Pilot Studies

- Cortical auditory event-related potentials in patients with auditory brainstem implants

Research Resources

- Administrative Core
- Technical Core
- Clinical Measurement Core

Index Terms

acoustics; auditory system; centers of research excellence; child; childhood; clinical; clinical data; cognitive function; communication; computerized data processing; development; evoked potentials; hearing; hearing aids; hearing impairment; language; language development; language perception; learning; measurement; perception; performance; peripheral; relating to nervous system; sound; speech; speech perception; translational research; visual; visual process; visual processing, word learning

[Back to top](#)

P30GM110768- Phase 3
The Molecular Biology of Neurosensory Systems
University of Nebraska Medical Center

Principal Investigator

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Thematic Scientific Focus

Neurosensory and neurodevelopmental disorders and interventions

Research Projects

- Role of miR-1290 in neurodevelopment
- Regulation of hippocampal synapses by glutamate delta-1 receptor
- Generating chimeric mice with human iPSC-derived astroglia for modeling down syndrome
- Calcium and pH homeostasis at auditory hair cell synapses
- The Role of NMDA receptor subtypes in generating and treating disrupted neuronal oscillations
- Role of fibroblast growth factor signaling in sensory development
- Synaptic dysfunction as an early window into glaucoma pathology
- Molecular mechanisms regulating differentiation and morphogenesis of cochlear inner and outer hair cells

Research Resources

- Mouse Genome Engineering Core
- Histology and Imaging Core
- DNA Microarray and Sequencing Core
- Auditory Physiology Core

Index Terms

neurosensory disorders, central nervous system, inner ear development, developmental neuroscience, neurodevelopmental disorders, inflammation, hearing loss, vision loss, Usher syndrome, ototoxicity, autism

[Back to top](#)

P20GM109090- Phase 1
Harnessing Movement Variability to Treat and Prevent Motor Related Disorder
University of Nebraska Omaha

Principal Investigator

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Thematic Scientific Focus

Center for Research in Human Movement Variability

Research Projects

- Gait variability in peripheral arterial disease
- The effects of virtual reality on gait variability after stroke
- Breathing and walking coupling variability in chronic obstructive pulmonary disease
- Foot biomechanics and thermoregulation in peripheral artery disease and diabetes

Faculty Recruits' Research

- Temporal variability of daily ambulatory activity as a non-invasive biomarker for Parkinson's disease

Pilot Project Mechanism Research

- Variability of movement on an altered inertial dynamics task
- The effect of virtual reality on human movement variability

Research Resources

- Motion analysis laboratory
- Virtual reality laboratory
- Motor development laboratory
- Machine Shop
- Acoustics laboratory
- Balance and strength laboratory
- Robotics laboratory

[Back to top](#)

- Digital motion capture systems
- Split-belt treadmills
- Gait-o-Gram
- Body weight support systems
- Audiometer
- Speech analysis system
- Data analysis software
- Force platforms
- Isokinetic Dynamometer
- Respirometer
- Biostatistical support
- Eye-tracking
- Oxymeter
- Inmotion upper extremity robot
- Neurocomm Balance Master
- Staircase instrumented with force platforms
- fNIRS system
- Pressure mats
- Pressure insoles
- Ultrasound system

Index Terms

Peripheral Arterial Disease, visual perception, gait variability, locomotor adaptation, kinematics, muscle activation, kinetics, Chronic Obstructive Pulmonary Disease, breathing, typically developing infants, Autism Spectrum Disorder, postural sway, Stroke, biomechanics, coupling biorhythms, posture, human movement, complexity, nonlinear dynamics, fractals, mathematical chaos, motor control, motor learning, motor disorders, movement dysfunction

[Back to top](#)

P20GM113126- Phase 1**Nebraska Center for Integrated Biomolecular Communication (CIBC)****University of Nebraska - Lincoln****Principal Investigator****James M. Takacs, PhD***University of Nebraska- Lincoln**Department of Chemistry**807B Hamilton Hall**Lincoln, NE 68588-0304**Tel: 402-472-6232**Fax: 402-472-9402**E-mail: JTAKACS1@UNL.EDU**Web: <http://unlcms.unl.edu/cas/chemistry/integrative-biomolecular-communication/about-cibc>***Thematic Scientific Focus**

Development of collaborative research teams with broad disciplinary representation to interrogate complex disease pathways, especially by connecting researchers who are developing new molecular probes and analytical techniques with those unravelling molecular mechanisms of complex diseases

Research Projects

- Metabolic syntrophy between human gut bacteria and archaea
- The role for N-glycan carrying Sialyl-Lewis(x) in progression of prostate cancer
- Stress-induced pathway of cell-cell adhesion disruption in pemphigus pathogenesis
- Structure-function relationships of the unique NO-sensitive regulator WhiB1 from *Mycobacterium tuberculosis*
- *In vitro* liver models to investigate the progression of liver fibrosis
- Identification and biomaterial targeting of causative biochemical factors in low back pain
- Hyperglycemia antagonizes endothelial cell sensing of blood flow and promotes development of advanced atherosclerotic plaques
- *Clostridium difficile* biofilms as mediators of intermicrobial competition
- Carbohydrate-metal complexes; molecular dynamics simulation of ion mobility in gas phase
- Intracellular NO sensing

Research Resources

- Administrative Core
- Systems Biology Core
- Data Management and Analysis Core

Index Terms

systems biology, pathway interactions, development, disease, interdisciplinary, disease progression, metabolic, regulatory pathway, signal transduction, proteomics

[Back to top](#)

P20GM104320- Phase 1

Nebraska Center for the Prevention of Obesity Diseases through Dietary Molecules
University of Nebraska Lincoln

Principal Investigator

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Thematic Scientific Focus

Nutrient signaling in the prevention of obesity and obesity-related diseases

Research Projects

- Palmitoleate signaling, miRNAs, and lipoapoptosis
- Redox signaling, endoplasmic reticulum stress, high-fat diet, and metabolic syndrome
- Bioinformatics-guided discovery of dietary microRNA signals in obesity
- Gut microbe signaling, epigenetics, and inflammatory processes
- Regulation of white adipocyte browning by dietary fatty acids Effects of dietary exosome-like nanoparticles on inflammasome activation in macrophages
- Impact of fetal oxygen and adrenergic adaptations on metabolic outcomes in IUGR offspring.
- Identification of metabolic biomarkers and signaling changes associated with obesity-related hepatocellular carcinoma.
- Endothelial long non-coding RNA Meg3, adipose tissue dysfunction, and obesity
- Palmitoleate protection against 3-hydroxy fatty acid-induced lipotoxicity to placental and maternal liver during acute fatty liver of pregnancy

Pilot Studies

- A novel cecum cannulated human gut microbiota associated pig gastrointestinal model to study signals produced by the gut microbiome that interact with host gene expression leading to a lean or obese phenotype
- Identification of surface proteins that mediate the uptake of milk exosomes
- Matrix based liver models to study obesity-related liver disease
- The role of chronic inflammation in fetal origins of obesity and metabolic dysfunction
- Computational method to select bioactive dietary-peptides inhibiting microbial pathways associated with obesity
- Molecular Characterization of human miRISC complexes following treatment with cow milk exosomes

[Back to top](#)

Seed Grants

- Molecular characterization of human miRISC complexes following treatment with cow milk exosome miRNAs
- Biomarkers of progressive fatty liver
- Mechanism of 3-hydroxy fatty acid-induced placental trophoblast and hepatocyte lipoapoptosis
- Adipokine Mechanobiology for Insulin Signaling
- Role of dietary microRNAs on human macrophage function
- Identification of microRNA in grapefruit extracellular vesicles and its target gene that reduce NLRP3 inflammasome activation

Research Resources

- Bioinformatics
- Biostatistics
- Experimental Design
- Computer Center
- Cell Biology
- Body Composition Analysis in Humans and Small Animals
- Live Animal Imaging
- Mouse Phenotyping
- Molecular Biology
- Gene Expression Analysis
- Metabolomics and Proteomics
- Gnotobiotic Mouse Facility

Index Terms

obesity, nutrient signaling, diabetes, heart disease, microbiome, non-alcoholic fatty liver disease, microRNA, cholangioapoptosis, brown adipose tissue, apoptosis, fatty acids, diet, nutrition, tissue engineering, RNA biology, exosomes, extracellular vesicles, dietary exosomes, regulation of human gene expression, miRNAs, acute fatty liver of pregnancy, lipoapoptosis, endoplasmic reticulum stress, mitochondrial dysfunction, redox signaling, long non-coding RNA, endothelial function, obesity, DNA damage, p53 signaling, dietary-peptides, gut-microbiome, obesity, microbial-pathway inhibition, hepatocellular carcinoma, obesity, trans-fat, fructose, metabolomics, signaling changes, non-alcoholic fatty liver disease, developmental origins of health and disease (DOHaD), adipocyte, mechanobiology, insulin signaling, type 2 diabetes, macrophages, inflammation

[Back to top](#)

P20GM109025- Phase 1

COBRE: Center for Neurodegeneration and Translational Neuroscience (CNTN)
Cleveland Clinic Foundation

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Thematic Scientific Focus

Neurodegeneration and translational neuroscience, neuroimaging, immune biomarkers of neurodegenerative disease

Research Projects

- The relationship between neuropsychological testing and MRI, PET, and blood biomarkers in Alzheimer's and Parkinson's disease(PD)
- Cross-sectional and longitudinal MRI analysis of the functional and structural brain networks underlying mild cognitive impairment in PD
- Immune markers linking pathogenesis in animal models and human neurodegenerative disease

Research Resources

- CNTN Administrative Core
- Clinical and Translational Research Core
- Data Management and Statistics Core
- Magnetic Resonance Imaging and PET/CT Imaging
- Behavioral Neuroscience Laboratory, Animal Facility, Genomics Core, and Confocal and Biological Imaging Core at the University of Nevada Las Vegas

Index Terms

neurodegenerative, human subjects, animal models, vertebrate animals, Alzheimer's Disease, Parkinson's disease

[Back to top](#)

P30GM110767- Phase 3
COBRE: Smooth Muscle Plasticity
University of Nevada, Reno

Principal Investigator

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Thematic Scientific Focus

Smooth muscle plasticity in response to changing stimuli or microenvironments

Research Resources

- Molecular Expression and Transgenic Core
- Protein Expression and Analysis Core
- Dynamic Imaging Facility

Index Terms

smooth muscle biology, smooth muscle plasticity, integrins, calmodulin, smooth muscle proteomics, stretch-activated potassium channels, bowel obstructions

[Back to top](#)

P20GM103650- Phase 2
Center for Integrative Neuroscience
University of Nevada, Reno

Principal Investigator

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Thematic Scientific Focus:

Integrative neuroscience, mechanisms of normal brain function and neural deficits

Research Projects

- Statistical models for group comparison of functional MRI data
- Using socially assistive robot assistants to augment neuro-rehabilitation exercise therapy
- Role of motor signals for perception during self-motion
- Functional diversity of olfactory receptor neurons
- The role of DOMINO in regulation of circadian rhythms in *Drosophila*
- Mechanisms of 3'UTR lengthening and its function in axon guidance

Pilot Studies

- Dark side of night lighting: Effects of light spectra on neurosensory function
- Word recognition and the visual cortical processing of two-dimensional shape information

Research Resources

- Neuroimaging Resources Core
- Cellular and Molecular Imaging Core
- Virtual and Augmented Reality Core

Index Terms

cognitive neuroscience, cellular neuroscience, genetics, neuroimaging, neural disorders

[Back to top](#)

P20GM113131--Phase 1

Center of Integrated Biomedical and Bioengineering Research (CIBBR)

University of New Hampshire

Principal Investigator

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Thematic Scientific Focus

Collaborative, cross-disciplinary interactions between biomedical, bioengineering, and behavioral sciences at UNH

Research Projects

- Neural pathways underlying learning with nicotine stimulus
- The role of cAMP signaling in neuronal primary cilia
- Development of a point-of-care metabolomic diagnostic sensor towards identification of MDD
- Design principles of microporous polymeric scaffolds for immunomodulation and material-tissue integration
- Implantable sensor array for in vivo, real-time monitoring of multiple neurotransmitters, surface analysis

Research Resources

- University Instrumentation Center (UIC)
 - Imaging Core
 - Spectroscopy Core
 - Engineering Services Core
- Hubbard Center for Genome Studies (HCGS)
- Research Computing Center (RCC)
- Animal Resource Office (ARO)

Index Terms

bioengineering, neuroscience, behavioral science, interdisciplinary, faculty development, X-ray photon spectrometry, confocal microscopy, biosensors, addiction, obesity, depression, signal transduction, neuronal primary cilia, electrochemical sensors, tissue engineering, regenerative medicine, microporous scaffolds, neurotransmitters, microfluidics, genomics, pharmacology, ciliopathy

[Back to top](#)

P30GM103415- Phase 3
Center for Molecular, Cellular and Translational Immunology
Dartmouth College

Principal Investigator

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Thematic Scientific Focus:

Immunology in the prevention, diagnosis and treatment of human diseases

Research Resources

- Educational, Mentoring and Administrative (EMAd) Core
- Immune Monitoring and Flow Cytometry Shared Resource
- The Transgenic and Humanized Immune System Mouse Facility
- DartMouse™, The Mouse Speed Congenic Core Facility at Dartmouth

Index Terms

immunology, speed congenics, transgenics, humanized mice, autoimmune disease, immune monitoring, immunoassays, genetic construct

P20GM104416 – Phase 1
Center for Molecular Epidemiology
Geisel School of Medicine at Dartmouth

Principal Investigator

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Thematic Scientific Focus:

Molecular epidemiology

Research Projects

- Early risk factor related epigenetic alterations in breast cancer pathogenesis
- Neonatal microbiome, exposures and infection
- Relation between *in-utero* vitamin d and immune function in early childhood
- Assessing maternal-fetal exposure pathways using bio-imaging
- Functional studies of the developing infant gut microbiota using metabolomics

Pilot Projects

- Effects of obesity on pathways driving early colorectal carcinogenesis
- Methylation subtypes of ovarian cancer in African American women
- Nest case-control study of epigenetic markers of early-life wheeze

Research Resources

- Biorepository Core

Index Terms

molecular epidemiology, biomarkers of exposure, disease susceptibility and pathogenesis

[Back to top](#)

P20GM113132-Phase 1

iTarget: Institute for Biomolecular Targeting
Dartmouth College

Principal Investigator

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Thematic Scientific Focus

Multidisciplinary research in biomolecular targeting with applications in signaling, inflammation, protein interactions and diseases such as cancer, emphysema, pneumonia, and other diseases

Research Projects

- Proteomic approaches to target the PP6-mTORC2 pathway in glioblastoma
- Identifying mitophagy receptors as targets in Ras-dysregulated cells
- Protein design for selective interference with LPA signaling in colon cancer
- Molecular mechanisms of RSV F activation and inhibition

Research Resources

- Molecular Tools Core
- Visualizing Molecular Interactions Core

Index Terms

translational research, molecular target, glioblastoma multiforme, phosphoproteomics, protein phosphatases, chronic obstructive pulmonary disease, microRNAs, airway inflammation, mitophagy, pancreatic cancer, computational protein design, PDZ domain binding selectivity, colon cancer, respiratory syncytial virus, membrane fusion

[Back to top](#)

P30GM106394- Phase 3

**Dartmouth Lung Biology Center for Molecular, Cellular and Translational Research
Geisel School of Medicine at Dartmouth**

Principal Investigator

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Thematic Scientific Focus

Molecular and cellular mechanisms in pathology and treatment of lung disease

Pilot Projects

- Microbial activity as a determinant of health status in cystic fibrosis
- Promoting the phagocytic clearance of non-motile *P. Aeruginosa*
- A novel murine model of allergic bronchopulmonary *Aspergillosis*

Research Resources

- Host Pathogen Interaction Core
- Live Cell Imaging Core
- Translational Research Core

Index Terms

Cystic fibrosis, *Pseudomonas*, *Staphylococcus*, *Streptococcus*, *Aspergillus*, *Candida*, cystic fibrosis transmembrane conductance regulator, CFTR, biofilms, microbiome, phagocytosis, cytokines, inflammation, protein engineering, drug discovery

[Back to top](#)

P20GM103472- Phase 2**Multimodal Imaging of Neuropsychiatric Disorders (MIND): Mechanisms & Biomarkers
The Mind Research Network****Principal Investigator****Vince Calhoun, PhD***The Mind Research Network**1101 Yale Blvd, NE**Albuquerque, NM 87106**Tel: 505-272-1817**Fax: 505-272 8002**E-mail: vcalhoun@unm.edu**Web: <http://cobre.mrn.org>**<http://www.mrn.org>***Thematic Scientific Focus**

Neuroimaging in schizophrenia, neural mechanisms of psychosis and mood disorders

Research Projects

- Discriminating schizophrenia from bipolar disorder by N-way multimodal fusion of brain imaging data
- Combined effects of SNPs and CNVs on brain structure in patients with schizophrenia and bipolar disorder
- Socio-emotional dysfunction in schizophrenia and bipolar disorders: Facial, vocal
- Transcranial direct current stimulation for treatment of auditory verbal hallucinations
- Multi-modal imaging investigation of electroconvulsive therapy response in late-life depressive episodes

Pilot Studies

- Meg investigations of auditory orienting: moderating effects of schizophrenia and nicotine dependence
- Multimodal neuroimaging of corollary discharge in psychosis: MEG and fMRI
- Capturing information flow and joint sufficiency in a meta-modal framework
- Multisensory tasks to investigate mechanisms of improved cognition in schizophrenia

Research Resources

- 3 Tesla Siemens TIM Trio whole body scanner equipped with Sonata gradient subsystem (40 mT/m amplitude, 200 μ s rise time, 100% duty cycle)
- Elekta Neuromag MEG System
- High Density Electroencephalography (EEG) Lab
- An enterprise level data center with neuroinformatics tools and automated analysis capabilities

[Back to top](#)

- Biostatistics and Neuroinformatics Core
- Administrative, Clinical Assessment, And Mentoring (ACAM) Core
- Multimodal Data Acquisition (MDA) Core
- Algorithm and Data Analysis (ADA) Core
- Biostatistics and Neuro-Informatics (BNI) Core

Index Terms

schizophrenia, bipolar disorder, depression, neuroinformatics, multimodal imaging, resting fMRI, MEG, EEG, DTI, cognition, gating, biostatistics

[Back to top](#)

P20GM121176

Autophagy, Inflammation and Metabolism (AIM) in Disease Center
University of New Mexico Health Science Center

Principal Investigator

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Thematic Scientific Focus

Autophagy and its interactions with inflammatory and metabolic processes

Research Projects

- Regulation of beige fat development by mTORC1 and autophagy
- TRIM-directed autophagy in HIV restriction and control of inflammation
- Regulation of intestinal tight junction barrier and inflammation by autophagy
- Unfolded protein response and autophagy in T helper cell effector function

Research Resources

- AIM Administrative Core
- Autophagy Scientific Core
- Inflammation and Metabolism Core

Index Terms

Autophagy, disease, inflammation, metabolism, unfolded protein, development, pathway interactions

[Back to top](#)

P30GM103400- Phase 3
Integrative Program in CNS Pathophysiology Research
University of New Mexico

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Thematic Scientific Focus

Central nervous system pathophysiology

Pilot Projects

- Neurorepair following traumatic brain injury in infants: erythropoietin to reverse
- Microstructural and diffusion magnetic resonance imaging abnormalities
- Neural basis of spatial disorientation in Alzheimer's disease
- Enhancement of cerebral perfusion for the treatment of Alzheimer's disease
- MRI-based structural study to validate VLP vaccines against AD

Research Resources

- Magnetic resonance imaging
- Electron paramagnetic resonance spectroscopy and imaging
- Confocal laser scanning microscopy
- Animal surgery models
- Animal behavior tests

Index Terms

central nervous system, pathophysiology, stroke, brain injury, neuroimaging, neurological disorders

[Back to top](#)

P30 GM110907- Phase 3
COBRE Center for Evolutionary and Theoretical Immunology
University of New Mexico

Principal Investigator

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Thematic Scientific Focus

Evolutionary and theoretical immunology, host-pathogen interaction

Pilot Studies

- Host transcriptomic response to acute respiratory viral infection
- How does climate change alter the activities of pathogens and symbionts to affect host health?
- The immune system of a parasite and its contribution to the defense of the host-parasite unit
- Uncovering conserved mechanisms of cardiac fibrosis using *Drosophila*
- Improved microbiome profiling using emulsion PCR and long-read sequencing

Research Resources

- Molecular Biology Core
- Cell Biology Core
- Controlled Environments Core

Index Terms

evolutionary immunobiology, theoretical immunology, innate immunity, immunology, RNAi, comparative immunology, evolution, host, core facilities

[Back to top](#)

P20GM109089- Phase 1

University of New Mexico (UNM) Center for Brain Recovery and Repair
University of New Mexico Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Development and testing of interventions for survivors of acquired brain injuries

Research Projects

- Functional recovery from acute brain injury via human neural stem cell transplantation
- Brain stimulation in animal models of recovery from acute brain injury
- Predicting recovery of cognitive control deficits in traumatic brain injury
- Transcranial direct current stimulation for treatment of deficits after traumatic brain injury
- Targeted tDCS to enhance treatment outcomes in persons with aphasia

Research Resources

- Pre-Clinical Recovery and Repair Core (PRRC), including anatomic & behavioral testing, *in vivo* electrophysiology & optogenetics
- Clinical Recovery and Repair Core (CRRC), including study coordination, neurocognitive testing, EEG, tDCS

Index Terms

neurological disorders, traumatic brain injury, stroke, aphasia, cognitive function, mood, transcranial direct current stimulation, stem cells, EEG, neuroimaging

[Back to top](#)

P30GM103329- Phase 3

COBRE in Pathophysiological Signaling in Neurodegenerative Disorders

University of North Dakota School of Medicine & Health Sciences

Principal Investigator

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Thematic Scientific Focus

Neurological disorders, traumatic brain injury and epilepsy, causes and treatments, systems biology

Pilot Projects

- Novel mechanism for neuroprotection against ischemic stroke injury through lipid synthesis *in vivo*
- Cross-center validation study for epigenetic changes associated with epileptogenesis
- Detection of AD-like pathology in HIV-1 transgenic rats
- Investigating AKAP12 function in neurovascular development/repair using CRISPR
- Slowly AD progression and accelerated aging using multiple interventions

Research Resources

- Mass Spectrometry Core
- Edward C Carlson and Image Analysis Core Facility

Index Terms

neurodegeneration, Alzheimer's disease, Parkinson's disease, traumatic brain injury, epilepsy, necrosis, apoptosis, axonal degeneration and regeneration, growth factors, phospholipid metabolism

[Back to top](#)

P20GM109024- Phase 1

Center for Diagnostic and Therapeutic Strategies in Pancreatic Cancer
North Dakota State University

Principal Investigator

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Thematic Scientific Focus

Development of diagnostic and therapeutic tools for the early detection and treatment of pancreatic cancer

Research Projects

- Nanoparticle-powered chemiluminescent lateral flow biosensor array for early diagnosis of pancreatic cancer
- Combination Therapy: Targeting pancreatic cancer with a ROS inducer and gemcitabine
- Development of monoclonal antibodies to inhibit RAGE activation in pancreatic cancer tumors
- Spatially-controlled, combination drug delivery platform using pH-responsive polymersomes

Pilot Projects

- Identification of CpG sites to use as early detection biomarkers in pancreatic cancer
- Metabolic regulation of pancreatic cancer by apoptosis inducing factor
- Manufacturing pancreatic cancer tissue microarrays using 3D tumor spheroids
- Bio-manufacturing of cancerous pancreas tissue with controlled gradient hypoxia

Research Resources

- Animal Core Facility
- Biostatistics Core Facility

Index Terms

diagnostic, malignant neoplasm of pancreas, therapeutic, cancer etiology, cell model, early treatment, combination therapy, monoclonal antibodies, drug delivery, polymersomes

[Back to top](#)

P30GM114748- Phase 3
Center for Visual and Cognitive Neuroscience
North Dakota State University

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Thematic Scientific Focus

Empirical and theoretical analysis of human visual and cognitive performance in normal and dysfunctional states

Pilot Studies

- Visual synchrony and the analysis of visual scene dynamics
- Selective attention to multimodal stimuli
- Natural image variance and contrast origin ambiguity
- Infant's use of visual information in object individuation
- Mechanistic studies on novel anti-PDGFR compound SJ001 targeting proliferative vitreoretinopathy
- Perceptual and neural sensitivity to grammatically relevant acoustic information
- Attentional and physiological correlates of interpersonal stress and mental health in childhood and early adolescence
- Embodied vision: action influences on visual processing near the hands
- Resting and task-related cortical connectivity in Schizophrenia and health
- Effects of loneliness and nostalgia on cognitive and neurological indicators of self-regulation
- The role of visual attention in successful sleep health promotion

Research Resources

- High-Density EEG/Neurostimulation Core Facility
- Driving Simulator Core Facility
- Technical Services Core Facility (includes High Dynamic Range Imaging, Immersive Virtual Reality, Electro-optical Instrumentation, and Eyetracking capabilities)

Index Terms

visual processing, working memory, vision, cognition, eye movements, neural activity, EEG/ERP, attention, RT

[Back to top](#)

P20GM113123- Phase 1
Center for Excellence In-Host Pathogen Interactions
University of North Dakota

Principal Investigator

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Thematic Scientific Focus

Pathogens and various model systems to study events that underlie host response upon pathogen invasion, study of host response to infectious diseases and elucidate how modulation of host responses determine disease outcomes

Research Projects

- Innate response and sepsis
- Autophagy and lung infection
- Host response and Neuroborreliosis
- Viral proteins and neuroinflammation
- Helminth and neuroinflammation

Research Resources

- Flow Cytometry Core
- Histology Core

Index Terms

pathogen, communicable diseases, infections, immune responses, epigenetic process, sepsis, neuroinflammation, disease outcome, vector-transmitted infectious disease, bacterial infection, model system

[Back to top](#)

**P30GM103332- Phase 3
Center for Protease Research
North Dakota State University**

Principal Investigator

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Thematic Scientific Focus

Proteases and disease, structural biology driven drug discovery

Research Resources

- Molecular Biology Facility
- Bioassay Facility
- Cell and Tissue Culture Facility
- Core Synthesis Facility and Analytical Services
- Mass Spectrometry Facility
- Microscopy Facility
- Nuclear Magnetic Resonance Facility
- X-Ray Crystallography Facility

Index Terms

cancer, asthma, arthritis, obesity, structural biology, reactive oxygen species, histone deacetylase, epigenetics, autophagy, synthesis of inhibitors

[Back to top](#)

P20GM104360- Phase 1

**Center for Biomedical Research Excellence, Epigenomics of Development and Disease
University of North Dakota**

Principal Investigator

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Thematic Scientific Focus

Epigenomics of development and disease

Research Projects

- The roles of RNAII pausing as a dynamic epigenetic mark during neural stem cell differentiation
- Molecular mechanisms of chromatin remodeling associated with trans- differentiation: epithelial to mesenchymal transition
- Long-lasting effects of juvenile antidepressant use on behavior and epigenetic regulation of gene expression
- Epigenetic regulation of neural-vascular interactions in cortical development

Research Resources

- Bioinformatics Core
- Next-generation sequencing

Index Terms

epigenetics, epigenomics, stem cells, development, cancer, neurodegeneration, environmental exposures, epithelial to mesenchymal transition, addiction

[Back to top](#)

P20GM103639- Phase 1
Mentoring Translational Cancer Research in Oklahoma
University of Oklahoma Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Tumor biology: resistance to cancer therapy and mitigating strategies

Research Projects

- HuR: role in mediating resistance to radiation
- Molecular determinants of gemcitabine transport in pancreatic cancer therapy
- Tumor resistance mechanisms to anti-VEGF therapy in ovarian cancer
- Targeted therapy against neuroblastoma

Pilot Studies

- Novel strategies for targeting cancer stem-like cells expressing hepatitis C virus
- Targeting LPA-signaling for developing ovarian cancer therapeutics

Research Resources

- Histology and Immunohistochemistry Core
- Small Animal Imaging Core
- Biospecimen Pathology Core

Index Terms

cancer, metastasis, chemotherapy, radiation-therapy, resistance, tumor cell biology

[Back to top](#)

P30GM110766- Phase 3
Molecular Mechanisms and Genetics of Autoimmunity
Oklahoma Medical Research Foundation

Principal Investigator

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Thematic Scientific Focus:

Molecular and genetic basis of autoimmune diseases

Research Resources

- Genomics Core
- Quantitative Analysis Core

Index Terms

autoimmune disease, inflammatory rheumatic diseases, systemic lupus erythematosus, Sjögren's syndrome, sarcoidosis, autoantibody, autoantigen

P20GM109097- Phase 1
Children's Health Equity Solutions Center (CHESC)
OSU Center of Health Sciences

Principal Investigator

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Thematic Scientific Focus

Adolescent health behavior and health promotion, adolescent risk taking behavior, health disparity, translational science

Research projects

- Pathways to teen rapid repeat pregnancy and adverse outcomes
- Examining epidemiology of folate status attributable to adolescent alcohol use
- Juntos against alcohol tobacco and drug use intervention trial

Research Resources

- Methods Core

Index Terms

child health care, health equity, translational research, mortality, biological markers, infant mortality,

[Back to top](#)

**P30GM103510-05 – Phase 3
Science in a Culture of Mentoring
Oklahoma Medical Research Foundation**

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Thematic Scientific Focus

Molecular and cellular immunology in the context of human health and disease

Research Resources

- Clinical, Phenotyping and Biorepository Core
- Human Immunophenotyping and Immune Function Core
- Human Monoclonal Antibody Core
- Serum Analyte and Biomarker Core

Index Terms

immunology, vaccine, signaling, inflammation, inflammatory disease, DNA microarray, imaging, proteomics, immunodeficiency, autoimmune disease, SLE, arthritis, genomics

[Back to top](#)

P20GM103648- Phase 1
Oklahoma Center for Respiratory and Infectious Diseases
Oklahoma State University-Stillwater

Principal Investigator

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Thematic Scientific Focus:

Infectious diseases of the respiratory system

Research Projects

- Development of an RSV vaccine by molecular manipulation of the viral matrix protein
- A novel tissue-equivalent respiratory model to study airway reactivity to infectious agents
- Control of lung inflammation by a TLR4-interacting SPA-derived peptide
- Neutrophil-mediated acute lung injury in influenza virus pneumonia

Pilot Studies

- Exploration of clpp activation to treat respiratory infections in cystic fibrosis
- β , β -carotene 9',10'-oxygenase 2 (BCO2) in influenza virus pneumonia
- Does PA0327 bind calcium and regulate *Pseudomonas aeruginosa* virulence?
- The role of angiogenic factors in the development of atherosclerosis during *Chlamydia pneumoniae* infection
- Influenza-Host protein interactions control viral infection and pathogenesis
- Develop single domain antibodies for blocking interleukin 17 receptor signaling
- *Pseudomonas aeruginosa* intra-species interactions
- Nanotherapeutic modulation of autophagy for treatment of lung pathogens
- The effect of avirulent rickettsial infections on Rocky Mountain spotted fever pathogenesis: aerosol and needle inoculation
- Azoreductase characterization of *Pseudomonas aeruginosa* strain FRD1, a cystic fibrosis isolate
- Photoreceptors as a novel class of virulence factors in opportunistic pathogens
- The role of glutamate in the initiation and maintenance of pleurisy
- Validation of bacterial condensins as drug targets
- Plakophilin 2 controls polymerase assembly of Influenza A virus
- Computational modeling of tuberculosis granuloma activation

[Back to top](#)

- Regulation of glucose transportation in the healthy and diabetic lung: novel targets
- The role of cytomegalovirus in immunosenescence and influenza susceptibility
- Phage-like chromosomal islands and virulence in *Pneumococci*
- Ribosome analysis of *Pseudomonas* biofilms from cystic fibrosis patient strains
- Multi-scale dosimetry modeling of influenza virus-laden droplets through the pulmonary role
- The role of glucose homeostasis during respiratory infections
- Evasion of host RNA decay machinery by the NS1 protein of 2009 pandemic flu
- Identifying the function of novel Ca-binding protein mediating Ca regulation of *P. aeruginosa* virulence

Research Resources

- Animal Model Core
- Immunopathology Core
- Molecular Biology Core

Index Terms

respiratory pathogens, influenza, respiratory syncytial virus, pulmonary infections, pathogenesis, tissue engineering, vaccine, lung inflammation, pneumonia

[Back to top](#)

P20GM104934- Phase 2
Mentoring Diabetes Research in Oklahoma
University of Oklahoma Health Sciences Center

Principal Investigator

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Thematic Scientific Focus

Mentoring junior investigators in research of diabetes and diabetic complications

Research Projects

- Mechanisms of mitochondrial dysfunction in diabetic cardiomyopathy
- Mechanisms of impaired angiogenesis in diabetes mellitus
- Effects of rbp4 elevation on endothelium and retina
- Molecular determinants of SHCA gene function in diabetes
- Neural function and protection in diabetic retina

Research Resources

- Administrative/Mentoring Core
- Diabetes Animal Core
- Histology and Imaging Core
- Biostatistics Core

Index Terms

diabetes mellitus, diabetic mouse, biological assay, urine, creatinine, knockout mice, retina, renal, heart

[Back to top](#)

P30GM114731- Phase 3
Interdisciplinary Research in Vascular Biology
Oklahoma Medical Research Foundation

Principal Investigator

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Thematic Scientific Focus

Vascular biology

Research Resources

- Microscopy core
- Phenotyping core
- Flow cytometry and cell sorting core
- Cardiovascular pathophysiology core

Index Terms

host defense, inflammation, antibody, autoimmune disease, glycosylation, atherogenesis, angiogenesis, and lymphangiogenesis

[Back to top](#)

P20GM121312-Phase 1

**The Center for Neuroscience-Based Mental Health Assessment and Prediction (NEUROMAP)
Laureate Institute for Brain Research**

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Thematic Scientific Focus

Mental health, predictions of risk and outcomes for mental disorders

Research Projects

- Cerebellar neuromodulation to enhance fear extinction and predict response to exposure therapy
- Predicting treatment response to exposure therapy using a carbon dioxide habituation
- Interoceptive dysfunction and appetite dysregulation in depression
- Response to inflammatory challenge in major depressive disorder
- Neural basis of interoceptive dysfunction and anxiety in anorexia nervosa

Research Resources

- Administrative Core
- Research Core

Index Terms

mental health, neuroscience, prediction, response, depression, neural, interoceptive dysfunction, anxiety, NeuroMap

[Back to top](#)

P20GM103636-Phase 1
Expanding Excellence in Developmental Biology in Oklahoma
Oklahoma Medical Research Foundation,

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Thematic Scientific Focus

Developmental Biology

Research Projects

- Reactive oxygen species in the epi/pericardium regulate *Drosophila* heart physiology
- Understanding connective tissue development and disease with platelet-derived growth factor receptor (PDGFR)-driven models of fibrosis
- The roles of Hop2 and Mnd1 in mouse meiotic homologous recombination
- TopBP1 and TICCR in the chemotherapy response and embryonic development
- Derivation of pancreatic beta cells from human induced pluripotent stem cells
- Mechanisms of digestive organ regeneration

Pilot Studies

- Identification of an Anti-Apoptotic Mutation Causing Cancer Predisposition
- Role of c-Myb in CD4 lineage commitment and iNKT cell development
- Role of the mitochondrial matrix protease ClpP in mitochondrial protein homeostasis
- Exploring the potential that the thymus is an alternative site for ILC2 cell development
- Regulation of myofibroblast formation in post-surgical adhesions

Research Resources

- Flow Cytometry Core
- Imaging Core
- Bioinformatics and Pathways Core

Index Terms

reactive oxygen species, *Drosophila* cardiac function, platelet-derived growth factor receptors, fibrosis, adipogenesis, lineage tracing, homologous recombination, meiosis, DNA replication, replication timing, zebra fish, Type 1 diabetes, human induced pluripotent stem cells, chromatin remodeling, lineage commitment, iNKT cells, mitochondrial homeostasis, mitochondrial matrix protease ClpP, high throughput screening, pancreatic β -cell survival, planaria, postsurgical adhesions, regeneration, chromatin remodeling

[Back to top](#)

P20GM103640- Phase 1

Oklahoma Center of Biomedical Research Excellence (COBRE) in Structural Biology
University of Oklahoma-Norman

Principal Investigator

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Thematic Scientific Focus

Macromolecular targets for rational drug design

Research Projects

- Structure-function studies of MsvR, a methanogen-specific transcriptional regulator
- Probing the potential of the gyrase inhibitor ParE for antibacterial applications
- Structural characterization of gamma-glutamyl transferase enzymes
- Mechanistic studies of CRISPR-mediated bacterial immunity

Research Resources

- Macromolecular Crystallography Laboratory (MCL) Core
- Protein Production Core (PPC)
- Laboratory of Biomolecular Structure and Function (LBSF) Core

Index Terms

X-ray crystallography, structure/function studies, structural biology, transcription, protein-nucleic acid interactions, cancer, antimicrobial drug targets, oxidative stress, bacterial immunity

[Back to top](#)

P20GM103642- Phase 1
Center for Neuroplasticity at the University of Puerto Rico
University of Puerto Rico Medical Sciences Campus

Principal Investigator

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Thematic Scientific Focus

Neuroplasticity in response to spinal cord injury, alcohol exposure, and the genetic basis of plasticity at the synapse

Research Projects

- Estradiol and Tamoxifen as neuroprotective/neurodegenerative agents after spinal cord injury
- The role of sensory input to mammalian locomotion after the loss of supraspinal inputs
- Prefrontal glutamate plasticity in adolescent alcohol drinking
- The potassium channel Slowpoke and the molecular mechanisms of neuronal homeostasis

Research Resources

- Neuroimaging Core
- Electrophysiology Core

Index Terms

alcoholism, spinal cord injury, dopamine, synaptic homeostasis, synaptic release, pattern generators

[Back to top](#)

**P30GM122732- Phase3
COBRE for Skeletal Health and Repair
Rhode Island Hospital**

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Thematic Scientific Focus

Health and disease mechanisms and repair strategy in cartilage and bone

Research Resources

- Bioengineering Core
- Molecular Biology and Imaging Core

Index Terms

cartilage, bone, growth plate, skeletal dysplasia, joint degeneration, osteoarthritis, chondrosarcoma, angiogenesis, tissue engineering, stem cells, bioengineering

[Back to top](#)

**P20GM119943- Phase 2
Stem Cells and Aging
Rhode Island Hospital**

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Thematic Scientific Focus

Neural and hematopoietic stem cell biology and the impact of aging

Research Projects

- The role of Abelson interactor 1 protein in the etiology of myelofibrosis and myeloid metaplasia
- The role of aged marrow microenvironment in determining normal and malignant hematopoiesis
- Study of the genomic mechanisms of neural stem cell senescence
- To identify mechanisms of how FOXO3 maintains neural stem cells during aging

Research Resources

- Administrative Core
- Flow Core
- Molecular Core

Index Terms

stem cells, tissue, injury, signaling, hematopoietic and neural stem cells and aging, myelofibrosis, leukemia and aging

[Back to top](#)

P30GM110759- Phase 3
COBRE Center for Cancer Research Development
Rhode Island Hospital

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Thematic Scientific Focus

Cellular and molecular pathways leading to cancer

Pilot Studies

- Molecular and Mechanical Regulators of the Metastatic Niche and Ovarian Cancer Metastasis
- Leukemic Specific Peptides' Role in Allogeneic Cytotoxic T Cell Response
- Novel approach to treat pancreatic ductal adenocarcinoma and its metastasis in a patient derived xenograft (PDx) model

Research Resources

- Proteomics Core
- Molecular Pathology Core
- Pilot Project Core

Index Terms

cell biology, molecular biology, proteomics, cancer, signaling, and angiogenesis

[Back to top](#)

P20 GM109035- Phase 1

COBRE: Center for Computational Biology of Human Disease
Brown University

Principal Investigator

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Thematic Scientific Focus

Genomic screening approaches with direct relevance to human diseases, genomics medicine

Research Projects

- Incorporating ethnic and gender disparities in genomic studies of disease
- Integrative genomics of cancer survival
- Tolerance of viral/bacterial co-infections
- A drug repositioning strategy for healthspan extension
- Computational genomics of preeclampsia

Research Resources

- Computational Biology Core

Index Terms

computational biology, human diseases, genomics, bioinformatics, co-infection, viral, pre-eclampsia, cancer survival, infection, ethnic disparity, gender disparity, epigenetics, [microbiome analyses](#)

[Back to top](#)

P20GM104317- Phase 1
Immune-Based Interventions Against Infectious Diseases
University of Rhode Island

Principal Investigator

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Thematic Scientific Focus:

Immunology of infectious diseases, pathogen-host interactions, vaccines and immunotherapeutics

Research Projects

- Autophagy regulation of innate and adaptive immunity in dengue
- HIV exposed-uninfected infant immunity
- Novel vaccine candidate for pediatric *Falciparum malaria*
- Cellular effector mechanisms elicited by novel malaria vaccine candidate PfSEA-1

Pilot Studies

- Role of vitamin A metabolism in immunity against intestinal bacteria
- Role of the SHP-2 phosphatase during NK cell response to MCMV infection
- Immunoglobulin A as a novel biomarker of intestinal dysbiosis in patients with Inflammatory Bowel Disease
- Determining the origin of bacteria in the serum microbiome of type II diabetics
- The impact of maternal systemic infection on fetal growth
- Cross-reactivity between Dengue and Zika Viruses
- Engineered RNA replicon-based vaccine for immunoprophylaxis against HIV

Research Resources

- Statistics and Data Management Core
- Cell Analysis and Sorting Core
- Luminex High-Throughput Analysis Core

Index Terms

infectious diseases, immunology, global health, dengue, HIV, malaria, host-pathogen interaction, innate immunity, adaptive immunity, vaccine

[Back to top](#)

P20GM103652- Phase 1
Cardiopulmonary Vascular Biology COBRE
Ocean State Research Institute, Providence VA Medical Center

Principal Investigator

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Thematic Scientific Focus:

Heart and lung disease pathogenesis and therapies

Research Projects

- Adenosine and lung endothelial injury
- Effects of angiotensins on shock-induced acute lung injury
- Improvement of coronary vascular functions by endothelium-targeted increase in reactive oxygen species *in vivo*
- Regulation of cardiac fibroblast function by microRNAs
- Sex hormones and pulmonary vascular and right ventricular dysfunction
- Mechanisms of calcification of atherosclerotic vascular disease

Pilot Studies

- Chi3L1 in a murine sepsis model

Research Resources

- The Administrative Core
- The Cell Isolation/Organ Function Core
- Animal Physiology Studies
- Tissue Culture Equipment
- Microscopes
- Image Analysis
- Molecular Biology Equipment

Index Terms:

endothelium, cardiomyocyte, cardiac fibroblast, inflammation, pulmonary, coronary, acute lung injury, atherosclerosis, pulmonary hypertension

[Back to top](#)

P20GM103645 - Phase 1
COBRE Center for Central Nervous System Function
Brown University

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Thematic Scientific Focus:

Behavioral, molecular genetic, and neural mechanisms in central nervous system functions

Research Projects

- Microcircuits for reward driven decision in *Drosophila*
- The neural basis of sequential control in human and non-human primates
- Mechanisms of cognitive interference from value-based choice conflict
- Cortical-subcortical interactions in attention and learning
- Target selection for visually guided actions

Pilot Projects

- Neocortical control of the thalamus
- Acute neuroimmune effects of alcohol using free water imaging

Research Resources

- Design and Analysis Core
- Administrative Core
- MRI physics support
- MRI Research Facility
- Non-invasive brain stimulation facility
- High-performance compute cluster

Index Terms

neuroscience, attention, decision making, imaging, neocortex, basal ganglia, action, molecular genetics, neurophysiology, reward spatial-temporal processes, top-down control

[Back to top](#)

P20 GM121298 - Phase 1
COBRE for Reproductive Health
Women and Infants Hospital-Rhode Island

Principal Investigator

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Thematic Scientific Focus:

Development of research infrastructure for multidisciplinary, translational program in women's reproductive health, mechanisms, preeclampsia, gestational diabetes, prematurity, biomarkers, computational approaches

Research Projects

- Extracellular matrix mechanisms of PPRM
- Novel mechanism of protein misfolding and aggregation in preeclampsia
- Discovery based approach to the genetics of preeclampsia,
- The cumulus transcriptome predicts preeclampsia and gestational diabetes in IVF

Research Resources

- Administrative Core
- Clinical and Translational Core
- Biostatistics and Data Management Core

Index Terms

reproductive biology, pregnancy complications, predictive markers, preeclampsia, gestational diabetes

[Back to top](#)

**P30GM114750 - Phase 3
COBRE for Perinatal Biology
Women and Infants Hospital-Rhode Island**

Principal Investigator

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Thematic Scientific Focus:

Reproductive biology and cardiopulmonary development, perinatal diseases such as preeclampsia and preterm birth, novel therapeutic strategies

Research Resources

- Research Core

Index Terms

biotechnology, clinical research, immune system, infectious diseases, perinatal, development, preeclampsia, embryonic development, antibodies, cardiac, cardiopulmonary, disease, therapy

[Back to top](#)

**P30GM103336- Phase 3
Center for Colon Cancer Research
University of South Carolina**

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Thematic Scientific Focus

Colorectal cancer biology, diagnosis, prevention, and treatment

Pilot Projects

- TP53-synthetic lethal therapeutic targets for colon cancer
- Non-alcoholic fatty liver disease and potentiation of colonic neoplasia
- Synthetic lectin sensor arrays for diagnosis of colorectal cancer
- Role of HPV in rectal cancer
- Linking macrophages to gut microbiota in obesity-enhanced colon cancer
- Targeting colon cancer using miRNAs

Research Resources

- Biotechnology Core
- Mouse Experimentation Core
- Tissue Biorepository
- Biometry Core

Index Terms

colorectal cancer, diagnosis, prevention, treatment, cancer biology

[Back to top](#)

P20GM109040- Phase 1
South Carolina Research Center for Recovery from Stroke
Medical University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Stroke recovery research

Research Projects

- Investigating the neurobiologic basis for loss of cortical laterality in chronic lesioned vs. non-lesioned hemisphere rTMS in stroke motor recovery
- Optimizing transcranial direct current stimulation current and electrode montage
- Treating depression and enhancing locomotor recovery post-stroke treating depression and enhancing locomotor recovery post-stroke
- Microvascular function and neuroplasticity after stroke

Pilot Studies

- Exploring potential roles of Hox genes in stroke recovery
- Application of ultrasound technology to enhance the quantitative measurement of post-stroke behavior and function
- Paired associative stimulation modulates motor excitability and plasticity in chronic stroke patients
- fMRI BOLD signal as a biomarker for optimal dosing of rTMS of rehabilitation in chronic stroke patients
- Sensory stimulation to enhance hand function post stroke
- Complement-dependent inflammation and experience-dependent neural plasticity after stroke
- Operant down-conditioning of the soleus H-Reflex Hemiparesis after stroke
- Novel training approach for treatment of swallowing impairment patients with refractory dysphagia after stroke
- Role of the insular cortex in swallowing impairment and recovery after stroke
- The role of obesity on stroke recovery in a mouse model of ischemic stroke
- Behavior and neuronal function following a single vs multiple sessions of rTMA in a rat chronic stroke model

[Back to top](#)

Research Resources

- Administrative Core
- Brain Stimulation Core
- Clinical and Translational Tools and Resources Core
- Neuroimaging Core
- Quantitative Behavioral Assessment and Rehabilitation Core

Index Terms

stroke, stroke recovery, rehabilitation, multidisciplinary research, neurological disease, neurological impairment, neuroscience, occupational therapy, physical therapy, psychiatry, radiology, translational research

[Back to top](#)

P30GM103342- Phase 3
South Carolina COBRE for Developmentally Based Cardiovascular Diseases
Medical University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Etiology of congenital heart disease and adult cardiovascular diseases

Research Resources

- Morphology, Imaging, and Instrumentation
- Histology/Imaging and Flow Cytometry
- Genomics and Bioinformatics Core
- Gene Function Core

Index Terms

cardiovascular disease, congenital heart malformations, acquired heart disease, proteomics, genomics, apoptosis, cell biology, DNA microarray, histology, morphology, 3D-reconstruction, confocal microscopy, fluorescence microscopy, high content screening microscopy, transgenic mice, gene targeting, next generation sequencing, RNA-seq, small RNA profiling, biostatistics, FACS cell sorting, multi-parameter cell analysis, rare event cell sorting

P20GM103641- Phase 1
COBRE Center for Dietary Supplements and Inflammation
University of South Carolina at Columbia

Principal Investigator

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Thematic Scientific Focus

Mechanisms through which dietary supplements regulate inflammation-associated diseases

Research Projects

- Epigenetic regulation of the allergic response by the flavonol morin
- Programming stem cell fate in an inflammatory microenvironment
- Prevention/treatment of *H. pylori*-induced gastritis/cancer by indole-3-carbinol
- Adipose tissue engineering: a therapeutic strategy for metabolic disease

Pilot Studies

- Gene-environment interactions in autism spectrum disorders using neuronal organoids
- Effects of short-term curcumin and multi-polyphenol supplementation on the anti-inflammatory properties of HDL
- Impacts of Δ^9 -tetrahydrocannabinol on gut microbiota and its metabolite profiles
- Garlic to reduce inflammation and oxidative stress during dengue infection

Research Resources

- Flow Cytometry and Cell Sorting Core
- Immune Monitoring Core
- Microscopy and Imaging Core

Index Terms

dietary supplements, inflammation, ginseng, plant polyphenols, catechins, flavones, theaflavins, anthocyanidins, resveratrol-derivatives, withaferin-a, panaxynol, atherosclerosis, Alzheimer's disease, cardiac remodeling, cardiac dysfunction, depression, prostate cancer, cardiovascular disease, social stress, amyloid- β protein, autophagy, NF-kB, SIRT1, Nrf2, macrophage inhibitory, cytokine-1, NOD-like receptor (NLRP3), inflammasomes, blood pressure, heart rate variability, prevention, suppression, anti-inflammatory, antioxidant, COBRE, gut microbiota

[Back to top](#)

**P30GM103339- Phase 3
COBRE in Lipidomics and Pathobiology
Medical University of South Carolina**

Principal Investigator

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Thematic Scientific Focus

Pathobiology of bioactive lipids in signaling and metabolic networks regulating diseases

Pilot Projects (2015-2016)

- Roles of sphingolipid accumulation during progression of liver disease
- Regulation of osteosarcoma progression by osteoblasts through Sphk1/S1P signaling
- Roles of novel sphingolipids in the protection from alcoholic liver disease

Research Resources

- Lipidomics Core
- Protein Science Translational Core
- Animal Pathobiology Core

Index Terms

sphingolipids, lipidomics, sphingolipid metabolism and signaling, ceramide, sphingosine 1-phosphate

P20GM109091- Phase 1
Center for Targeted Therapeutics
University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Discovery of drugs aimed at molecular and cellular targets that play key roles in human diseases

Research Projects

- Dual targeting of Gq/11 and calcineurin for leukemia therapy
- Potentiating targeted drugs in breast cancer via transcription-regulating kinases
- Novel Structure-Based Design of Potent Resveratrol Derivatives with Therapeutic Potential
- Targeting inhibin in cancers lacking the type III TGF-beta receptor

Pilot Studies

- Identification of novel targets which can enhance PARP1 inhibitor therapy by focused or genome-wide pooled CRISPR/Cas9 library technology

Research Resources

- Functional Genomics
- Synthetic Chemistry and Drug Discovery
- Microscopy and Flow Cytometry

Index Terms

target identification, targeted drugs, drug discovery, functional genomics

[Back to top](#)

P20GM109094- Phase 1
COBRE: Eukaryotic Pathogens Innovation Center (EPIC)
Clemson University

Principal Investigator

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Thematic Scientific Focus

Interdisciplinary study of parasitic diseases, eukaryotic pathogens and transmission, host defense, and pathogen biology

Research Projects

- Energy Metabolism in the parasite, *Entamoeba histolytica*
- Glycosome biogenesis in African trypanosomes
- Glucose sensing and hexokinases in the African trypanosome
- Fatty acid synthesis, surface molecules, and immune evasion
- Mechanisms of septin-based temperature stress response in *maski*

Pilot Projects

- Targeting trypanosome motility as a new path to treatment of neglected tropical diseases

Research Resources

- Administrative Core
- Clemson University Genomics Institute (CUGI)
- Clemson Light Imaging Facility (CLIF)

Index Terms

innovation, pathogen, African Trypanosomiasis, malaria, meningitis, Amebic colitis, interdisciplinary, human disease, virulence, transmission process, aneuploidy

[Back to top](#)

P20GM103542- Phase 2

South Carolina COBRE in Oxidants, Redox Balance and Stress Signaling
Medical University of South Carolina

Principal Investigator

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Thematic Scientific Focus

Oxidative stress biology and therapeutics in acute and chronic diseases and aging

Research Projects

- Systems-based analysis of redox activity in aortic valve stenosis
- A novel therapeutic strategy for Parkinsons disease
- The response of cancer stem cells to oxidative stress
- Targeting redox regulation to overcome proteasome inhibitor resistant multiple myeloma
- Mitochondrial disease mutations as genetic risk factors to develop liver disease

Research Resources

- Cell and Molecular Imaging Core
- Proteomics Core
- Bioenergetics Core
- Analytic Core

Index Terms

glutathione, oxidants, redox balance, stress signaling

[Back to top](#)

P20GM103444- Phase 2

**Bioengineering Center of Regeneration and Formation of Tissues (SC BioCRAFT)
Clemson University**

Principal Investigator

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Thematic Scientific Focus

Tissue regeneration through cell-biomaterials interactions using bioengineering approaches

Research Projects

- Neuron-specific polymeric micelle delivery system for neural regeneration (nanotherapeutics)
- Bioinformatics and polymer microarrays enabled development of injectable hydrogels for therapeutic angiogenesis
- Diabetes-resistant tissue engineered small diameter vascular grafts
- Bioengineering the sinoatrial node using a small molecule approach
- Promoting intervertebral disc regeneration via novel biomaterials and by modulating inflammation

Pilot Projects

- Mechano-Adaptive Fibrosis Signaling for Post-Infarct Therapy
- Turning Etiologies of Fibrosis across Organs into Remedial Therapies

Research Resources

- Bioengineering and Bioimaging Core
- Cell, Tissue, and Molecular Analyses Core

Index Terms

biomaterials, tissue engineering, organ replacements, tissue regeneration, cardiac tissue engineering, neural tissue engineering, drug delivery

[Back to top](#)

P20GM103548- Phase 2
Center for Cancer Biology
Sanford Research

Principal Investigator

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Thematic Scientific Focus

Cancer cell biology, immune effects on cancer growth and therapy, tumor markers, head and neck cancer, childhood cancer

Research Projects

- Immune mediated mechanisms of metastasis
- Cisplatin mediated immune modulation of HPV positive head and neck cancer
- The impact of PD-1 inhibition on immune-response to chemoradiotherapy
- Exploring the origins of childhood leukemia: investigating transcriptional networks in hematopoiesis and acute leukemia

Research Resources

- Molecular Pathology Core
- Flow Cytometry

Index Terms

cancer biology, tumor markers, tumor specific antigens, cancer signaling pathways, cancer immunology, mouse models of cancer, breast cancer, head and neck cancer, medulloblastoma, lymphoma, cancer gene expression

[Back to top](#)

P20GM103620- Phase 1
Center for Pediatric Research
Sanford Research

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Thematic Scientific Focus:

Developmental processes and pediatric diseases

Research Projects:

- Oncogenic mechanisms of Sox2 in Rb-deficient tumors
- Modeling disorders of lipid metabolism with induced pluripotent stem cells
- The role of Notch pathway in bone development and osteosarcoma
- Role of nonmuscle myosin II in membrane trafficking and organ function
- Thioredoxin signaling and pulmonary development during perinatal oxidative injury

Research Resources:

- Protein Biochemistry Core
- Imaging Core
- Molecular Biology Core

Index Terms:

developmental biology, pediatrics, childhood disease, proliferation, morphogenesis, migration, differentiation, and cancer

[Back to top](#)

P20GM121341-Phase 1**Transdisciplinary Approaches to American Indian and Rural Population Health Research
Sanford Research/USD****Principal Investigator*****Paul A. Thompson, PhD****Methodology and Data Analysis Center**Sanford Research**2301 E 60th St North**Sioux Falls, SD 57104**Tel: 605-312-6462**E-mail: paul.thompson@sanfordhealth.org***Thematic Scientific Focus**

American Indian rural health research in an ecological framework

Research Projects

- Exploring trajectories of social-emotional risk and resilience for rural youth
- CHOICES for AI teens (chat): prevention of alcohol exposed pregnancies with American Indian adolescents
- Exploring the role of American Indian undergraduates social networks during the transition to college
- Effects of prenatal and early life exposures on the microbiome in American Indian children.

Research Resource

- Administrative Core
- Research Ethics and Dissemination Core (READ)
- The Collection Methods, Management and Analysis of Data Core (COMMAND)

Index Terms

American Indian, rural health, microbiome, youth, rural population, environment, community health

[Back to top](#)

P30GM118228- Phase 3
Vermont Immunobiology / Infectious Diseases Center
University of Vermont

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Thematic Scientific Focus

The immune response to infectious agents and their mechanism of pathogenicity

Pilot Studies

- The role of SLAM/Sap signaling pathway in host immune response to *Klebsiella pneumoniae*
- Manipulating the gut microbiota to prevent cryptosporidiosis
- A genetic model to study inflammatory bowel disease
- Regulation of *Klebsiella* virulence determinants by lung surfactant

Research Resources

- Genome Technologies and Bioinformatics Core
- Proteomics and Mass Spectrometry Core
- BSL3 Core

Index Terms

innate adaptive immunity, NKT and gamma/delta T cells, dendritic cells, bacterial pathogenesis, *Pseudomonas aeruginosa*, *Clostridium difficile*, *Borrelia burgdorferi*, viral pathogenesis, influenza virus, dengue virus, arenaviruses, hantavirus, coxsackievirus, parasite pathogenesis, *Cryptosporidium parvum*, *Entamoeba histolytica*, *Toxoplasma gondii*, vaccine trials, autoimmunity multiple sclerosis, rheumatoid arthritis, Lyme arthritis, genetic susceptibility, maternal/fetal immunology, metabolic regulation, immune system, bacteria

[Back to top](#)

P20GM103644- Phase 1
Vermont Center on Behavior and Health
University of Vermont

Principal Investigator

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Thematic Scientific Focus

Investigating relationships between behavior (i.e. lifestyle) and risk for chronic disease and premature death

Research Projects

- Incentives to improve cardiac rehabilitation participation in low-income patients
- Measuring the impact of lifestyle and behavior on breast cancer incidence in high-risk women
- Incentives to improve cardiac rehabilitation participation in low-income patients
- Smartphone-based financial incentives to promote smoking cessation among pregnant women
- The effects of stress on capillary-to-arteriole communication in the brain
- Improving smoking cessation in socioeconomically disadvantaged young adults

Pilot Studies

- Smoking cessation among limb salvage patients with peripheral arterial disease
- Using financial incentives to increase STI/HIV testing among young Latinos
- Contingency management for smoking cessation among African American women

Research Resources

- Administrative Core
- Behavioral Economics and Intervention Sciences Core
- Collaboration and Dissemination Core

Index Terms

behavioral economics, risk behaviors, substance abuse, obesity, chronic disease, vulnerable populations, health disparities

[Back to top](#)

P30GM103532- Phase3
Translational Research in Lung Biology and Disease
University of Vermont & State Agricultural College

Principal Investigator

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Thematic Scientific Focus

Translational research in the diagnosis and treatment of lung disease

Research Resources

- Transgenic Animal Core
- Pathophysiological Phenotyping Core
- Clinical Support Core

Index Terms

physiology, lungs, asthma, biomedical engineering, transgenic animals, signaling, inflammation, chronic obstructive pulmonary disease

**P30GM103488- Phase 3
COBRE for Signal Transduction and Cancer Phase 3
West Virginia University Cancer Institute**

Principal Investigator

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Thematic Scientific Focus

Cancer cell signal transduction and biology

Research Resources

- West Virginia Flow Cytometry Core Facility
- Microscope Imaging Facility
- Animal Models and Imaging
- Bioinformatics and Biostatistics Core
- Biospecimen Processing Core

Index Terms

flow cytometry, imaging, biospecimens, EMT, invasion, stem cells

P20GM109098- Phase 1
West Virginia Stroke COBRE
West Virginia University

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Thematic Scientific Focus

Biomarkers, acute treatment, and rehabilitation for stroke

Research Projects

- The Impact of cardiovascular function on stroke outcome
- A genomic bio-signature of post-stroke immune dysfunction
- Corticospinal control of sensorimotor synergies in health and disease
- Corticospinal control of limb dynamics in health and after stroke
- Effects of perfluoroalkyl chemicals on stroke incidence and mortality

Research Resources

- Administration Core
- Experimental Stroke Core
- Biostatistics Core
- Mitochondrial Functional Assessment Core
- Rodent Behavior Core

Index Terms

stroke, biomarkers of stroke, neuronal injury, autonomic nervous system and stroke, treatment of stroke, rehabilitation from stroke, environmental chemicals and stroke

[Back to top](#)

**P30GM103398- Phase 3
Neuroscience Core Center
University of Wyoming**

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Thematic Scientific Focus

Normal brain development and experiential effects on brain organization and function, sensory neuroscience, synaptic plasticity, and neuropathological processes

Pilot Studies

- Interaction of dietary salt consumption and the onset of puberty
- Dietary salt attenuates the weight gaining effect of a high fat diet
- Activity-dependent control of olfactory sensory neuron turnover

Research Resources

- Microscopy Imaging Core (confocal and electron microscopes, calcium imaging)
- Molecular Analysis Core
- Antibody Production

Index Terms

neuroscience, neuroplasticity, nociception, somatosensory, neuroendocrine, confocal microscopy, ultrastructure, receptor signaling, development, olfaction

[Back to top](#)

P20GM121310-Phase1
Wyoming Sensory Biology COBRE
University of Wyoming

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Thematic Scientific Focus

Sensory systems and related disorders, sensory processes at the molecular, cellular, physiological and system levels

Research Projects

- How an olfactory sensory neurons choice of odorant receptor gene determines its wiring
- The role of presenilin in a developing visual circuit
- Cathepsin K, a novel mediator of inflammatory pain
- Modulation of pain signaling mechanisms by *Botulinum* neurotoxin A

Research Resources

- Administrative Core
- Integrated Microscopy Core

Index Terms

sensory system, somatosensation, chemosensation, vision, sensory function, dysfunction